CURRICULUM VITAE

Victor Y. Pan

Department of Mathematics and Computer Science
Lehman College - City University of New York
Bronx, New York 10468
Tel. (914) 737-2637 (home) and (718) 960-8568 (office)
Fax (718) 960-8969
E-Mail: victor.pan @ lehman.cuny.edu
Website: http://comet.lehman.cuny.edu/vpan/

Education: Moscow State University (MGU), 1961: M.S. and 1964: Ph.D. in Math (Advisor: A. G. Vitushkin)

AREAS OF RESEARCH SPECIALIZATION: Design and Analysis of Algorithms, Polynomial Computations, General Matrix Computations, Structured Matrix Computations, Randomized Matrix Computations, Numerical Algorithms, Symbolic Algorithms, Symbolic–Numerical Algorithms, Graph Algorithms.

1 MY RESEARCH AND SERVICE TO PROFESSION: HIGHLIGHTS BY VICTOR PAN

1.1 BRIEF OUTLINE

Working in various areas of Mathematics, Computational Mathematics, and Computer Science for more than five decades, I introduced new insights and novel methods, solved a number of challenging research problems, revealed unexpected links among some seemingly distant subjects, and proposed new research directions and new areas of study.

I was thrilled when in my research I was lucky to discover new keys that opened well-known scientific locks, particularly when *a single key opened a number of locks*, as this was the case with my techniques of active operation/linear substitution, trilinear aggregation, and transformation of matrix structures.

My work has led to creation of new fields and disciplines, in particular *Complexity of Algebraic Computations, Symbolic-Numerical Computations,* and *Algebraic Multigrid* (see my specific remarks in part 11 of Section 1.2). My high-impact contributions to the two former fields have been continuing from 1962 and 1992, respectively. Both fields are highly popular with application areas ranging from geometric modeling and robotics to cryptography and computational biology.

In 1985-2000 my work on the design of *fast and processor-efficient parallel algorithms* (by myself and with Reif, Bini, Galil, and other leading researchers) was also seminal.

I presented my findings in four books (1623+LXXIV pages overall), over 20 surveys in journals and book chapters, over 170 research articles in journals and over 90 in refereed conference proceedings. Almost all my publications are in *Computer Science* and *Computational and Applied Mathematics.* I also disseminated the results of my work through research reports, lectures at the universities, research centers and professional conferences worldwide, the Internet, and personal communication with colleagues and students. My techniques, insights, concepts and definitions are commonly used, sometimes as folklore.

I am grateful for recognition and support of my research by leading experts, foundations (over $2,000,000 from *NSF* in 1980-2020, including *Special Creativity Extension Award* in 1993 from the Numeric, Symbolic, and Geometric Computation Program of the CCR Division in the Directorate CISE), journals, professional societies, universities (over $130,000 from *CUNY* in 1989-2016), and research centers. Enthusiastic reviews and citations of my work appeared in books, journals, and magazines.

I worked as a journal editor, a managing guest editor of special issues, and a member of the program and scientific committees of international conferences and workshops, where I also organized sessions and mini-symposiums. This work as well as my research and publications helped establish synergistic links among various areas of computing, in particular, theoretical computer science, symbolic computations, numerical computations, and applied linear algebra. My designation of Fellowship in American Mathematical Society in 2013 was for *"Contributions to the Mathematical Theory of Computation"*.

I supported students from my grants, published dozens of papers jointly with them, and was the mentor of 23 PhD students in their PhD defenses, including six African-Americans and three females. Some students continued joint research with me for more than a decade after the defenses.

1.2 MY RESEARCH JOURNEY

Next I comment on my education and my research in ten major subject areas of Computer Science and Computational Mathematics, not covering my work of 1965–75 in Economics in the USSR and some of my sporadic research excursions. I use some acronyms listed at the end of this section. Full references to my papers and books can be found in the list of my PUBLICATIONS in Section 2 as well as at http://comet.lehman.cuny.edu/vpan/ and in Google Scholar and DBLP.

0. Education and research areas. My scientific destiny was decided in the 59th high school in Moscow, Russia, celebrated for having excellent teachers in mathematics. I was among many of its graduates who went to the famous MechMat Department of Moscow State University (MGU), headed by *Andrey N. Kolmogorov.* Kolmogorov was one of the greatest mathematician of his time, and so was his student Vladimir Arnold, also graduated from the 59th school in Moscow.

My adviser *Anatoli G. Vitushkin*, a world leading expert in the theory of functions of real and complex variables, was among distinguished Kolmogorov's disciples, has also worked with a versatile scientist Alexander S. Kronrod, and like Kolmogorov and Kronrod had broad scientific interests.

From 1956 to 1961 I enjoyed learning Mathematics in MechMat, but at that time Vitushkin also guided me into the research in Computational Mathematics. My first journal paper appeared in 1958 and was on the real function theory, but from 1959 to 1964 almost all my publications as well as my PhD Thesis were on Computational Mathematics. After my defense in 1964 I had to make living by working and publishing in Economics because job market in the USSR was quite restrictive for people of Jewish ethnicity. In 1976, however, I emigrated to the USA, and since 1977 have been working entirely in Computer Science and Computational Mathematics (see my employment history in Section 5.2.2).

1. My first scientific breakthrough: polynomial evaluation (1959–1966). In 1962, by introducing a novel technique of active operation/linear substitution, I proved *optimality of the classical algorithm for polynomial evaluation*, commonly called Horner's. My technique was adopted later by Volker Strassen and Shmuel Winograd for proving the optimality of the classical algorithms for some fundamental matrix computations (see Section 2.3 of the book by Allan Borodin and Ian Munro, The Computational Complexity of Algebraic and Numeric Problems, American Elsevier, NY, 1975). In that period I have also accelerated polynomial evaluation by means of pre-processing.

My work has been surveyed in my paper in Russian Mathematical Surveys, 1966, which had great impact in the West, leading to the emergence of the field of *Complexity of Algebraic Computations*, now quite popular. My study has been covered in the book by *Donald E. Knuth*, The Art of Computer Programming, volume 2, Addison-Wesley, 1981 (second edition), 1997 (third edition), which overall cites my work and that of R.P. Brent most extensively among all cited authors. I have become known in the West as *"polynomial Pan"*.

2. Breakthrough in fast matrix multiplication by means of trilinear (tensor) decomposition and aggregation (1978–1984). Matrix multiplication (hereafter referred to as MM) is one of the central subjects of the theory and practice of computing, and the scientific world was tremendously impressed in 1969, when Strassen decreased the classical exponent 3 of MM to 2.808, that is, performed MM by using less than cubic time. His work has been justly enjoying lasting worldwide recognition (and I praised his discovery. as well as his subsequent extensive work on algebraic computations, in my book and review article in SIAM Review in 1984, both much cited), but it is fair to recall that he himself has been attracted to this field by my paper in Russian Mathematical Surveys of 1966 and has paid tribute to my work in his chapters, both called *"Pan's method"*, in "Some Results in Algebraic Complexity Theory", Proceedings of the International Congress of Mathematicians, Vancouver, 1974 (Ralph D. James, editor), Volume 1, Canadian Mathematical Society (1974), pages 497–501, and "Evaluation of Rational Functions", in "Analytical Complexity of Computations" (edited by R.E. Miller, J. W. Thatcher, and J. D. Bonlinger), Plenum Press, New York (1972), pages 1–10.

Further progress toward performing MM in quadratic time was expected to come shortly, but all attempts to decrease the exponent 2.808 defied worldwide effort for almost a decade, until I decreased it in 1978. My work was most widely recognized as a long-awaited breakthrough. The following excerpt from a letter by Donald E. Knuth, is quoted here with his permission.

"I am convinced that his research on matrix multiplication was the most outstanding event in all of theoretical computer science during 1978. The problem he solved, to multiply $n \times n$ *matrices with less than* $O(n^{\lg 7})$ *operations, was not only a famous unsolved problem for many years, it also was worked on by all of the leading researchers in the field, worldwide. Pan's breakthrough was based on combination of brilliant ideas, and there is no telling what new avenues this will open."*

Indeed my techniques prompted fast new progress in the field, with my participation. I have become widely known as *"matrix Pan"* and to the experts as *"matrix and polynomial Pan"*.

I devised my fast MM algorithms by means of

(i) reducing the bilinear problem of matrix multiplication to the equivalent problem of trilinear (tensor) decomposition and

(ii) nontrivially exploiting its cyclic symmetry in the case of matrix multiplication.

My combination of the two techniques, called *trilinear aggregation* in [P78], was not novel in 1978: it was introduced in [P72] (in Russian), although its implementation in [P72] only supported an exponent below 2.85. Its implementation in [P82] yielded an exponent below 2.7734.

The paper [P72] was translated into English only in 2014, in arXiv:1411.1972, and was little known in the West until 1978.

Actually my trilinear aggregation technique of 1972 was a historic landmark on a wider scale. *It produced the first nontrivial decomposition of a tensor and the associated multilinear form that defined a new efficient algorithm for matrix computations.* Subsequently tensor decomposition has become a popular tool for devising highly efficient matrix algorithms in many areas of scientific computing.

Says E.E. Tyrtyshnikov, a renowned expert in tensor decomposition: "We should be especially thankful to Victor Pan for the link between the bilinear algorithms and trilinear tensor decompositions. Although it looks simple and even might be regarded as a folklore by now, this observation still has its creator, and by all means and for all I know it is due to the work of Victor Pan written in the Soviet period of his life."

Since 1978 my trilinear aggregation has been routinely employed by myself and my successors for devising new fast MM algorithms. After the stalemate from 1969 to 1978 the MM exponent has been decreased several times in 1979–1981, in particular, in FOCS 1979 and CAMWA 1981 below 2.522 (my record) and in FOCS 1981 and SICOMP 1982 below 2.496 (by Don Coppersmith and Shmuel Winograd). In my much cited SIAM Review of 1984 and book, LNCS, 179, Springer, Berlin, 1984, I surveyed the progress up to the date, focusing on the decrease of the exponent of MM because this was the focus of the research community. In J. of Complexity 1998, jointly with Huang, I accelerated rectangular MM, which implied new record complexity estimates for the computations of the composition and factorization of univariate polynomials over finite fields.

In 1986–1987 the MM exponent 2.496 of 1981 has been decreased below 2.376, then below 2.374 in 2010, below 2.373 in 2012, and below 2.372864 in 2014, which is still the current record. Every decrease relied on amazing novel techniques built on the top of each other, always employing the reduction of the MM problem to trilinear aggregation, as pointed out on page 255 of the celebrated paper by Coppersmith and Winograd of 1990.

As Arnold Schönhage has written at the end of the introduction of his seminal paper in SICOMP 1981, however, *all these exponents of MM have been just "of theoretical interest". They hold only for inputs "beyond any practical size", and "Pan's estimates of 1978 for moderate" input sizes were "still unbeaten".* Actually, in FOCS 1979, SICOMP 1980, and CAMWA 1981 and 1982 I successively decreased my record exponent for feasible MM (that is, for MM of moderate sizes $n \times n$, say, up to $n \leq 1,000,000$), and in CAMWA 1982 decreased it below 2.7734, which still remains the record in 2017. All smaller exponents have been obtained by ignoring the *curse of recursion*, that is, by means of applying long recursive processes, each squaring the input size. The resulting algorithms beat the classical one only for inputs of immense sizes.

My algorithms promise to be highly efficient in practice: their implementations by Igor Kaporin use substantially smaller memory and are more stable numerically than Strassen's algorithm [see Kaporin's papers in Numerical Linear Algebra with Applications, 6, 8, 687–700, 1999, and Theoretical Computer Science (Special Issue on Symbolic-Numerical Algorithms), 315, 2–3, 469–510, 2004].

3. Hierarchical aggregation as a springboard for the Algebraic Multigrid (1980). Compact Multigrid (1992–1993). In LAA 1980, jointly with Miranker I introduced hierarchical aggregation/disaggregation processes, substantially responsible for the emergence of the popular field of *Algebraic Multigrid*.

Jointly with Reif, in SPAA 1990, SIAM J. Scientific and Statistical Computing 1992 and CAMWA 1990 and 1993, I proposed a simple but novel acceleration technique of *Compact Multigrid*.

4. Parallel algebraic and graph algorithms (1985–2001). Throughout the years of 1985–2001, prompted by high recognition of my paper with John H. Reif at STOC 1985, I proposed, both with coauthors and by myself, a variety of new efficient parallel algorithms and in particular of fast and processor-efficient parallel algorithms for computations with matrices, polynomials, and graphs. They relied on our novel nontrivial techniques, and I regularly presented them at STOC, FOCS, and SODA Conferences and in SICOMP.

a) *Fast and processor efficient algorithms for matrix and polynomial computations.* In STOC 1985, jointly with Reif I introduced fast and processor efficient parallel algorithms for the solution of dense and sparse linear systems of equations. The study of processor efficiency of fast parallel algorithms was a novelty at that time. In 1985–86 this work was covered *in the magazines Science, Science News, and Byte.* The algorithm for sparse linear systems of equations has been implemented *on the supercomputers of NASA and Thinking Machines Corp.* By myself and jointly with coauthors I continued working on parallel matrix and polynomial computations for more than a decade, proposing nontrivial novel techniques, extending the list of the known fast and processor efficient parallel algorithms, and improving the known complexity bounds for the following fundamental computational problems: (i) the solution of general and structured linear systems of equations with integer input (see my papers in TCS 1987, IPL 1989, and SICOMP 2000) and over abstract fields (see my paper in CAMWA 1992 and my joint papers with Bini and Gemignani in ICALP 1991 and Kaltofen in SPAA 1991 and FOCS 1992), (ii) the computation of polynomial greatest common divisors (GCDs), least common multiples, and Padé approximations (see my papers in CAMWA 1992 and TCS 1996), (iii) polynomial division (see my joint papers with Bini in J. of Complexity 1986, FOCS 1992, and SICOMP 1993), and (iv) the computation of the determinant, the characteristic polynomial, and the inverse of a matrix (see my joint papers with Galil in IPL 1989 and Huang in J. of Complexity 1998).

b) *Graph algorithms.* To obtain fast and processor efficient parallel algorithms for the computation of matchings and paths in graphs, I have explored and exploited the known nontrivial reductions to matrix computations and applied some novel techniques for these computations. I published these results in FOCS 1985 and Combinatorica 1988 jointly with Galil, in JCSS 1989, IPL 1991, and SICOMP 1993 with Reif, in SICOMP 1995 with Preparata, in Algorithmica of 1997 with Han and Reif, and in my chapter in the Handbook on Computer Science 1993.

c) Together with Shallcross and my student Lin–Kriz, I proved the *NC-equivalence* of the integer GCD and planar integer linear programming problems, which was a well-known theoretical challenge (see our papers in SODA 1992, FOCS 1993 and SICOMP 1998).

5. Polynomial root-finding (1985–2017). Optimal solution of a four millennia old problem. The celebrated problem of univariate polynomial root-finding has been central in mathematics and applied mathematics for four millennia. The first traces of its study have been found on Sumerian clay tablets and Egyptian papyrus scrolls. It has important applications to modern signal processing, financial mathematics, control theory, computational algebraic geometry and geometric modeling. Hundreds of efficient algorithms have been proposed for its solution.

Two-part book published by Elsevier, in 2007 by J.M. McNamee (354 pages) and in 2013 by J.M. McNamee and myself (728 pages), covers almost all of them up to the date, in a *unique comprehensive coverage of this popular subject area*, but the research producing new algorithms has intensified in the last decade, so that part 3 may be needed reasonably soon.

Since 1985 I have been doing research in this area, as well as in the related areas of computation of approximate polynomial GCDs, matrix eigenvalues and eigenvectors, and the solution of a system of multivariate polynomial equations. Next I briefly outline some of my results referring the reader for further information to my papers cited below in parts (a)–(g) and the papers (individual and joint with my students) in FOCS 1985 and 1987, CAMWA 1985, 1987, 1995, 1996, 2011 (two papers), and 2012 (two papers, one of them joint with McNamee), SICOMP 1994, J. of Complexity 1996 and 2000 (four papers), JSC 1996, ISSAC 2010 and 2011, and SNC 2011 and 2014 (two papers).

a) In STOC 1995 (and also in CAMWA 1996, ISSAC 2001, and JSC 2002) I combined the advanced techniques by Schönhage and by Neff and Reif with my novelties in exploiting the geometry of the complex plane, precision control by using Padé approximation, and recursive lifting and descending. As a result I have substantially accelerated the known algorithms. My resulting divide-and-conquer algorithms of STOC 1995 approximate all roots of a univariate polynomial nearly as fast as one can access the input coefficients, in *optimal* (up to a polylogarithmic factor) *arithmetic and Boolean time*. I surveyed my work up to the date in SIAM Review 1997 and more informally in American Scientist 1998. I cover it in more detail in JSC 2002 and Chapter 15 of my book of 2013, joint with McNamee and already cited.

(b) A distinct algorithm solves a univariate polynomial equation in roughly quartic arithmetic time by means of applying Weyl's Quad-tree construction of 1924. Renegar decreased the time bound to cubic in 1987, and I reached quadratic arithmetic time bound in J. of Complexity 2000. Most of the computations of my algorithm required low precision, and this suggested that nearly optimal Boolean time can be also reached based on extension or refinement of my algorithm. I have not pursued that goal, but very recently this was achieved by R. Becker, M. Sagraloff, V. Sharma and C. Yap. Their work boosted interest to that direction because the approach promises to be practically more efficient than the divide-and-conquer method.

c) *Approximation of the real roots* of a polynomial is an important goal because in many applications, e.g., to algebraic optimization, only r real roots are of interest and because frequently they are much less numerous than all n complex roots. My algorithms in SNC 2007, CAMWA 2011, CASC 2012 and 2014, TCS 2017, and (joint with Elias P. Tsigaridas) in ISSAC 2013 and JCS 2016 accelerate the known algorithms for this problem by a factor of n/r. The algorithm in ISSAC 2013 and JCS 2016 achieves a more narrow goal of root-refining, rather than root-finding, and runs faster than my algorithms of [P95], being nearly optimal for its more narrow goal.

d) Together with Bini in J. of Complexity 1996, with Bini and Gemignani in CAMWA 2004, ETNA 2004 and Numerische Mathematik 2005, with McNamee in CAMWA 2012, by myself in CAMWA 2005, and jointly with my present and former students in ISSAC 2010, CAMWA 2011, LAA 2011, CASC 2012, and a chapter in the SNC volume of 2007, published by Birkhäuser, I proposed *novel matrix methods for polynomial root-finding.* Unlike many previous companion matrix methods, our techniques preserve and exploit the structure of the associated companion and generalized companion matrices, and we yielded numerically stable solution, while keeping the arithmetic cost at a low level. I further extended these algorithms to the solution of the eigenproblem for a general matrix in SODA 2005 and CAMWA 2006 and 2008.

e) Jointly with Bini, I proposed and elaborated upon an algorithm that *approximates all eigenvalues of a real symmetric tridiagonal matrix by using nearly linear arithmetic time.* This is a popular and important problem of matrix computations. We proposed the first algorithm of this kind, published in some detail in SODA 1991 and then in Computing 1992 and SICOMP 1998.

f) Computation of *approximate polynomial GCDs* is important in control and signal processing. My papers in SODA 1998 and Information and Computation of 2001 yielded a new insight into this computational problem by exploiting its link to *graph algorithms and polynomial root-finding.*

g) My papers with Bernard Mourrain in STOC 1998 and J. of Complexity *(Best Paper Award for 2000)*, with Bondifalat and Mourrain in ISSAC 1998 and LAA 2000, with Mourrain and Ruatta in SICOMP 2003, and Ioannis Z. Emiris in JSC 2002, CASC 2003, and J. of Complexity 2005, and in the references therein, introduced and analyzed a number of novel and now popular techniques and algorithms for the approximation of the roots of dense and sparse *systems of multivariate polynomials.* The algorithms exploited the structure of the associated matrices.

6. Algorithms for structured matrices: defining, unifying, and exploiting structure in the matrix world (1987–2017). This area is highly important for both theory and practice of computing. It was studied already in the 19th century and with increased intensity in the recent decades. Structure allows compressed representation and much faster computations versus general matrices, which made algorithms supporting such fast computations a subject of great demand.

My contributions can be traced back to FOCS 1987 with Reif and include the following directions (besides already cited applications to polynomial root-finding).

a) *Unification of structured matrix computations by using their displacement representation and the transformation of matrix structures.* The four most popular matrix structures of Toeplitz, Hankel, Vandermonde, and Cauchy types have different features, which allow different computational benefits. In particular, the Cauchy matrix structure, unlike the three other ones, is invariant in both row and column interchange and allows approximation by rank structured matrices, for which computations by means of the Fast Multipole Method are highly efficient.

The matrices of all four classes share, however, an important feature: they can be represented in compressed form, through their displacements of small rank. Every matrix M can be expressed via its displacements $AM - MB$ and $M - AMB$ under mild restriction on operator matrices A and B, but for each of the four classes of structured matrices and a proper pair of operators of shift and/or diagonal scaling, the displacement has small rank and thus can be represented with fewer parameters (typically with $O(n)$ parameters for an $n \times n$) structured matrix. Besides saving memory space, this enables fast computations with such matrices.

The approach was proposed by Kailath, Kung and Morf in 1979 for matrices with the structure of Toeplitz type and has been eventually extended to other structured matrices.

I contributed with my two books of 1994 (with Bini) and 2001 and dozens of papers by myself and with coauthors.

In particular in ISSAC 1989 and in MC 1990, I unified fast computations with the four listed matrix classes in a rather unexpected way. Namely, I observed that one can transform matrix structure at will by transforming the associated operator matrices, and moreover can do this by multiplying a given structured matrix by Hankel and Vandermonde matrices and their transposes. One can always use the simple reversion matrix as a Hankel multiplier and frequently can also simplify the transformations by using the matrix of the discrete Fourier transform or its Hermitian transpose as a Vandermonde multiplier. By applying such low-cost transformations of matrix structures one can *extend any successful algorithm for the inversion of the structured matrices of any of the four classes to the inversion of the matrices of the three other classes, and similarly for solving linear systems of equations.* Then the differences among the four matrix structures enable practical computational benefits.

In particular by 1989 Toeplitz-like inversion and linear system solving have already been performed in nearly linear arithmetic time by means of the MBA divide-and-conquer algorithm of 1980 of Morf and of Bitmead and Anderson, but for the Cauchy-like inputs cubic time was required for these tasks, and likewise for the Nevanlinna–Pick associated fundamental problem of rational approximation, closely linked to these computations. *My transformations decreased the known cubic complexity bounds for these highly important computational problems to nearly linear.*

At first my approach was considered purely theoretical because the MBA algorithm is numerically unstable, but *since 1995 it has become basic for a stream of highly efficient practical numerical algorithms* for Toeplitz linear systems of equations: the algorithms begin computations with the converse reduction to the Cauchy-like case and then exploit the invariance of Cauchy structure in row and column interchange since 1995 (cf. I. Gohberg, T. Kailath, V. Olshevsky, Math. of Computation, 64, 1557–1576, 1995) and the link of this structure to the *rank structure* of matrices and consequently to the Fast Multipole Method since 2005 (cf. P. G. Martinsson, V. Rokhlin, M. Tygert, Comput. Math. Appl., 50, 741–752, 2005, S. Chandrasekaran et al., SIAM J. Matrix Anal. Appl., 29, 1247–1266, 2007, and J. Xia, Y. Xi, M. Gu, SIAM J. Matrix Anal. Appl., 33, 837–858, 2012).

Thus *my work of 1989/90 was a key to the unification of computations with the two most important matrix structures, that is, displacement and rank structures, with tremendous range of algorithmic applications.*

In 2013–2017 I extended my method to Vandermonde and Cauchy matrix-by-vector multiplication, the solution of Vandermonde and Cauchy linear systems of equations, and polynomial and rational interpolation and multipoint evaluation. For all these classical problems, the known numerical algorithms, running with bounded precision (e.g., the IEEE standard double precision), required quadratic arithmetic time, and I decreased it to nearly linear, even thought my algorithms imply no decrease of the known bounds on the Boolean complexity of these computations (see P. Kirrinnis, J. of Complexity 1998, and my papers with Tsigaridas in SNC 2014 and TCS 2017).

For another application of my techniques, I formally supported empirical observation of many researchers (which *remained with no proof for decades*) that a Vandermonde matrix is ill-conditioned (that is, close to singular) unless it is close to a scaled matrix of discrete Fourier transform, whose knots are nearly equally spaced on or near the unit circle centered in the origin. (See my papers in LAA 2015, SIMAX 2016, and Math of Computation 2017.)

b) For *alternative and more direct unification* of computations with structured matrices of the four classes, one can express them in terms of operations with the displacements. The

MBA algorithm of 1980 does this for Toeplitz-like matrices, my papers in FOCS 1998 and LAA 2000, joint with Olshevsky and my student Zheng, respectively, extend that algorithm to Cauchy-like matrices, and my paper in SODA 2000 and book of 2001 achieve this in a unified way for a variety of computations with various structured matrices.

c) *Efficient algorithms for structured matrices and links to polynomial and rational computations.* In SIAM Review 1992, CAMWA 1992, 1993 (jointly with my students), TCS 1996, and Annals of Numerical Math. 1997 (by myself), and ICALP 1999, jointly with Olshevsky, I presented new efficient algorithms for various fundamental computations with structured matrices, such as computing their ranks, characteristic and minimum polynomials, bases for their null spaces, and the solutions of linear systems of equations with these matrices. Furthermore I have also extended successful methods for computations with structured matrices to some fundamental computations with polynomial and rational functions. Conversely, in SNC 2014 and TCS, joint with Tsigaridas (in print), I deduced nearly optimal estimates for the Boolean complexity of some fundamental computations with Vandermonde and Cauchy matrices by reducing these computations to the ones for polynomials and rational functions and modifying the known fast algorithms for the latter problems.

7. Newton iteration for matrix inversion. It reduces matrix inversion to matrix multiplications, which is attractive for parallel computations. In 1991 with R. Schreiber in SISSC I worked out nontrivial initialization policies and variations of the iteration that enhance performance. In Chapter 6 of my book of 2001 and in my paper with my students in MC 2006 I further improved performance by applying the *homotopy continuation* techniques.

The iteration is attractive for inversion of structured matrices, provided that the structure is preserved in iterative process. In J. of Complexity 1992, IEEE Transaction on Parellel and Distributed Systems 1993, and SIMAX 1993 I achieved this by employing some novel techniques, in particular *recursive re-compression*, that is, by recursively compressing displacements. This enabled solution by *"superfast algorithms"*, running in nearly linear arithmetic time. Moreover, the resulting algorithms allow processor efficient parallel implementation, and I have unified them over various classes of structured matrices. I presented these results in Chapter 6 of my book of 2001, my paper of 2010 in Matrix Methods: Theory, Algorithms and Applications, and my papers with coauthors in LAA 2002, TCS 2004, Numerical Algorithms 2004, and MC 2006.

8. Computation of the determinant of a matrix. This classical problem has important applications in modern computing, e.g., to the computation of *convex hulls* and *resultants*, with further link to the solution of multivariate polynomial systems of equations.

a) In TCS 1987 (Appendix) and IPL 1988 I reduced the computation of the determinant of a matrix to the solution of linear systems of equations and then applied *p-adic lifting* to yield the solution efficiently. By extending this approach Abbott et al. in ISSAC 1999, Eberly et al. in FOCS 2000, and myself jointly with Emiris in JSC 2003 obtained some of the fastest known symbolic algorithms for the computation of the determinant of a matrix and the resultant of a polynomial system.

b) I published novel algorithms for computing determinants in TCS 1999, jointly with three coauthors from INRIA, France, and in Algorithmica of 2001, jointly with my student Yu. The algorithms perform computations with single or double IEEE standard precision, based on algebraic techniques (in the TCS paper) and on numerical techniques (in the Algorithmica paper), use small arithmetic time, and certify the output. The TCS paper has accelerated the computations by means of output sensitive and randomization methods, novel in this context.

9. Symbolic–numerical computations: synergistic combinations. Numerical and symbolic algorithms are the backbone of modern computations for Sciences, Engineering, and Signal and Image Processing, but historically these two subject areas have been developed quite independently of one another. Synergistic combination of their techniques can be highly beneficial.

Since the early 1990s I have been promoting such benefits as an organizer of conferences, as a member of their Program Committees, as the Managing Editor of four Special Issues of the Theoretical Computer Science on this subject in 2004, 2008, 2011 and 2013. Perhaps even stronger impact into this direction was from my books of 1994 (joint with Bini), 2001, and 2013 (joint with McNamee), and from my surveys in SIAM Review 1992 and 1997, in NATO ASI Series published by Springer 1991, Academic Press 1992, and Kluwer 1998, in the electronic proceeding of IMACS/ACA 1998, and in my chapters (with co-authors) in four Handbooks of 1999, 2004, 2009 and 2014, as well as from dozens of my research papers, cited therein.

10. Randomized preprocessing: introducing chaos in order to stabilize fundamental numerical matrix computations (2007–2017). Since 2007 I have been working on randomized pre-processing of matrix computations. I have contributed a new direction, new insight, and novel techniques to the popular area of randomized matrix computations and reported *dramatic acceleration* of the solution of highly popular and highly important problem of *low-rank approximation*. See my papers (some joint with my students) in SNC 2007 (two papers) and 2009, CSR 2008, 2010, and 2016, TCS 2008, CAMWA 2009, LAA of 2009, 2010 (two papers), 2011, 2012, and 2013, ISSAC 2011, CASC 2015, and report in arXiv: 1611.01391.

I have advanced the known numerical algorithms for both nonsingular and homogeneous singular linear systems of equations. In particular I proved that with a probability near 1 randomized multiplicative preprocessing numerically stabilizes Gaussian elimination with no pivoting (GENP) and block Gaussian elimination, and I obtained similar results for any nonsingular and well-conditioned (possibly sparse and structured) multiplicative pre-processors and for the average input. This has emboldened the search for more efficient sparse and structured multipliers, and I proposed some new classes of them. The resulting algorithms are practically useful because pivoting (row/column interchange) is communication intensive and because Gaussian elimination is most used algorithm in matrix computations.

I obtained similar progress for the highly popular problem of low-rank approximation of a matrix, which has numerous applications to numerical linear algebra, machine learning, neural networks, and data mining and analysis. Then again my new insight formally supports the known empirical power of various sparse and structured multipliers and emboldens search for new ones. Then again I proposed some new classes of them for this task.

Moreover, in arXiv:1611.01391 [math.NA] 3 November 2016) I reported acceleration of low-rank approximation by order of magnitude. Here is a sketch of my argument.

Assume that an $m \times n$ input matrix has a small numerical rank $r \ll \min\{m, n\}$, that is, allows its rank-r approximation. Then the known algorithms compute such an approximation by using order of mn arithmetic operations. This may seem to be within a constant factor from the information lower bound $mn/2$ because an arithmetic operation can process at most two of the mn input entries.

I observed, however, that arithmetic cost of the solution can be decreased to a much lower level because the unknown output approximation is defined by $(m+n)r$ parameters, and indeed I proved that this cost decreases to the order $(m+n)r^2$ for the average input matrix already when one applies algorithms, much simplified versus the most advanced and sophisticated ones that yielded current record quadratic arithmetic time.

I supported my finding by estimating the average case complexity for two simple solution algorithms (including the cross-product extensions of the methods of Goreinov, Tyrtyshnikov, and Zamarashkin).

Since one can argue that realistic inputs can differ from the average input, I performed extensive numerical tests with benchmark inputs coming from discretized PDEs and some other real world input data, which turned out to be in very good accordance with my formal analysis. Such encouraging test results have been observed for both of Gaussian elimination and low-rank approximation.

To a great variety of the known applications of low-rank approximation my further study added a new one, that is, *dramatic acceleration of the Conjugate Gradient algorithms.*

I hope that my work will help to bridge the gap still existing between the researchers from the Theory of Computing and Numerical Linear Algebra working in this area.

11. Concluding remarks.

Throughout my career my novel methods have advanced the state of the art of various fundamental subjects of Computational Mathematics and Computer Science such as polynomial evaluation, interpolation, division, factorization, and root-finding, solution of general and structured linear systems of equations, and various other computations with general and structured matrices.

By introducing novel techniques, by myself and jointly with co-authors, I devised new efficient algorithms for the computation of linear recurrences, matching and paths in graphs, and the sign and the value of the determinant of a matrix, and I revealed a useful link of the computation of approximate polynomial greatest common divisors (GCDs) to polynomial root-finding and bipartite matching.

My novel ideas and techniques have been well-recognized although not always immediately: each of my trilinear aggregation of 1972 and my transformation of matrix structures of 1989 waited for six years before they became widely known, the value of my contribution of 2000 to quadtree root-finding is only now becoming appreciated, and so is the importance of my novel insights to and techniques for Gaussian elimination and low-rank approximation. As a result the contributions are praised more than their author, but the valuable progress in the field (even if it is delayed and attributed to later rediscoveries or refinements) is eventually achieved.

I was lucky to be responsible or to substantially share the responsibility for the creation of three fields of study, now thriving, namely, the Algebraic Complexity of Computations, Symbolic-Numerical Computations, and Algebraic Multigrid. My long survey in Russian Mathematical Surveys of 1966 inspired the interest of Shmuel Winograd and then Volker Strassen and their many followers to the subjects of the former field, creating this popular discipline.[1] Their work in turn attracted me to this field again. For another and striking

[1]The next and seminal paper in this subject area begins with: "Introduction.-In reference [1], V.Ya.Pan summarized the results about the minimum number of multiplications and additions required to compute a polynomial. In particular, Pan proved that the minimum number of multiplications/divisions required to compute $P_n(x)x = a_0 + a_l x + \cdots + a_n x^n$ is n. The theorem of this note includes this result of Pan's as a special case, and also shows that the minimum number of multiplications/divisions required to compute the product of an $n \times n$ matrix by a vector is $m \cdot n$." – S. Winograd, On the Number of Multiplications Required

example of cross-fertilization, my renewed interest to this field was prompted by the concise but far-fetching and clear exposition in the cited book of 1975 by A. Borodin and I. Munro, which was first book in Math that I have read after moving to the USA in 1977. In 1979 I learned from Borodin that his interest to the field was inspired by my paper of 1966 and Strassen's of 1969.

My paper with Willard L. Miranker in 1980 was the beginning of the field of the Algebraic Multigrid. My survey in SIAM Review in 1992 and my book with Dario Bini of 1994 attracted a large group of scientists to the benefits of combining the techniques of Symbolic and Numerical Computing, thus strongly contributing to the emergence of the new field.[2]

My book with Dario Bini (1994) is called "Polynomial and Matrix Computations" and includes a number of new research results by the authors. It covers its title subjects both thoroughly and comprehensively according to its praising reviews (see some excerpts below) and was frequently cited, as well as three other books, also devoted to polynomial and matrix computations, and my surveys in SIAM Review on matrix multiplication (1984), polynomial and matrix computations (1992), and polynomial root-finding (1997).

Excerpts from *SIGACT News*, ACM Press, 26, 2, pages 26–27, June 1995): "We are now greeted with the release of a book covering the basic, foundational material of the algebraic algorithm field, written by the authors who are leading researchers in the field and are responsible for many of the current best algorithms...... For researchers in the field of algebraic algorithms, this is a "must-have" book, both as a reference and the review of basic material...... In conclusion, for researchers in the field of algebraic computing, I highly recommend this book as an essential addition to your bookshelf."

Excerpts from *SIGSAM Bulletin,* ACM Press, 30, 3, pages 21–23, September 1996: "The book covers an impressive range of algorithmic issues in Theoretical Computer Science, Symbolic Computer Algebra and Numerical Computation, and the presence of several latest methods and results makes it exciting to read. It would be useful to a specialist in any of the above areas who wishes to undergo a rigorous study of polynomial or matrix operations for large problems using exact or approximate arithmetic...... The book is outstanding...... In conclusion, the book by Bini and Pan is an excellent companion for researchers and advanced students. Given, moreover, that it is a handy reference book, it should be present in every good library."

12. Acronyms

"CACS" stands for "Proceedings of Conference on Applications of Computer Algebra"

"CAMWA" stands for "Computers and Mathematics (with Applications)"

"CSR" stands for "Proceedings of Computer Science in Russia"

"FOCS" stands for "Proceedings of IEEE Symposium on Foundations of Computer Science"

"ICALP" stands for "Proceedings of International Colloquium on Automata Languages and Programming"

"IPL" stands for "Information Processing Letters"

"ISSAC" stands for "Proceedings of ACM International Symposium on Symbolic and Algebraic Computation"

to Compute Certain Functions, Proc. National Acad. of Sciences, 58, 1840-42, 1967.

[2]Besides consistently producing papers on the subjects of this field (the latest three in the TCS, in print), I was the Corresponding and Managing Guest Editor of four special issues of the TCS on its subjects in 2004, 2008, 2011, and 2013.

"JCSS" stands for "Journal of Computer and System Sciences"
"JSC" stands for "Journal of Symbolic Computation"
"LAA" stands for "Linear Algebra and Its Applications"
"LNCS" stands for "Lecture Notes in Computer Science"
"MC" stands for "Mathematics of Computation"
"SICOMP" stands for "SIAM Journal on Computing"
"SIMAX" stands for "SIAM Journal on Matrix Analysis and Applications"
"SNC" stands for "Symbolic-Numerical Computations or Proceedings of Workshop on SNC"
"SODA" stands for "Proceedings of ACM-SIAM Symposium on Discrete Algorithms"
"SPAA" stands for "Proceedings of ACM Symposium on Parallel Algorithms and Architecture"
"STOC" stands for "Proceedings of ACM Symposium on Theory of Computing"
"TCS" stands for "Theoretical Computer Science"

12. LIST OF PUBLICATIONS CLASSIFIED BY RESEARCH SUBJECTS

THE BOOKS, SURVEYS AND BOOKS CHAPTERS, AND RESEARCH PAPERS HAVE BEEN ENUMERATED BELOW ACCORDING TO THE PUBLICATION LIST (in a separate file)

1. REAL AND COMPLEX FUNCTIONS: papers 1, 3.

2. ECONOMICS: papers 11-13, 15-18

3. LOWER BOUNDS IN ALGEBRAIC COMPUTATIONS: papers 5, 7, 10, 29, 49.

4. FUNDAMENTAL POLYNOMIAL OPERATIONS.
a) EVALUATION: paper 10 covers the work up to 1966. Later work is covered in papers 19, 62, 70, 101, 105, 121, 140, 147, 166, 247, 248, 265.
b) INTERPOLATION: papers 62, 70, 105, 120, 140, 147, 158, 166, 247, 248, 265.
c) MULTIPLICATION: papers 118 (multivariate case) and 249.
d) DIVISION: papers 42, 48, 51-53, 58, 75, 86, 97, 103, 111, 161, 249.

5. MATH PROGRAMMING.
a) LINEAR PROGRAMMING: papers 13, 39, 43, 50, 55-57.
b) INTEGER LINEAR PROGRAMMING: papers 89, 113, 151.
c) NONLINEAR PROGRAMMING: paper 79.

6. FAST MATRIX MULTIPLICATION. My contributions of 1972-1984 ARE covered in book 1, survey paper 2, and the references therein, My later work in papers 95, 145, 156, 222.

7. MULTIGRID ALGORITHMS.
a) ALGEBRAIC MULTIGRID: paper 22.
b) COMPACT MULTIGRID: papers 73, 77, 92, 109.

8. PARALLEL COMPUTATIONS (ALSO SEE RELEVANT ITEMS IN PARTS 9-12 and 14).
a) PROCESSOR EFFICIENT ALGORITHMS IN NC: book 2 (chapter 4) and papers 42, 44-47, 50-58, 60, 61, 63, 66-69, 72, 74, 75, 80-82, 85, 88, 90, 93, 100, 102, 103, 106, 107, 111, 112, 115, 117, 119, 123, 125, 126, 129, 131-133, 138, 145, 164, 175.

b) NC EQUIVALENCE OF LINEAR PROGRAMMING AND EUCLIDEAN GCD: papers 89, 113, 151.

c) WORK-PRESERVING SPEED-UP: papers 91, 115, 122.

9. GRAPH ALGORITHMS.

a) MATCHING: papers 45, 63.

b) PATHS: item 6 in the list of book chapters; papers 54, 56, 66, 85, 90, 91, 122, 138.

10. LINEAR SYSTEMS OF EQUATIONS AND MATRIX INVERSION (GENERAL INPUT MATRICES).

a) NEWTON'S ITERATION AND RESIDUAL CORRECTION PROCESSES: book 3 (chapter 6) and papers 44, 69, 83, 178, 179, 187, 211, 216, 226, 231.

b) RANDOMIZED ALGORITHMS: papers 214, 215, 217, 220, 221, 223, 225, 228, 230, 232, 234, 237, 238, 245, 256, 258, 266.

c) OTHER METHODS: books 2 and 3 and papers 44, 45, 47, 60, 67, 74, 81, 82, 91, 122, 175, 238.

11. LINEAR SYSTEMS OF EQUATIONS AND MATRIX INVERSION (TRIANGULAR. BANDED OR SPARSE INPUT): item 6 in the list of book chapters and papers 44, 107, 115, 117, 125.

12. LINEAR SYSTEMS OF EQUATIONS AND MATRIX INVERSION (STRUCTURED INPUT).

a) DISPLACEMENT TRANSFORMATION OF MATRIX STRUCTURE; APPLICATIONS TO POLYNOMIAL EVALUATION AND INTERPOLATION: book 3 and papers 71, 76, 105, 140, 149, 155, 203, 247, 248, 253, 262, 265.

b) NEWTON'S ITERATION AND RESIDUAL CORRECTION PROCESSES: book 3 and papers 72, 88, 93, 106, 132, 141, 162, 175, 178, 179, 187, 200, 201, 204, 211, 216, 231, 251.

c) COMPRESSION OF THE DISPLACEMENTS: book 3 and papers 88, 93, 106, 108, 141, 162, 168, 179, 187, 211.

d) HOMOTOPIC/CONTINUATION TECHNIQUES: book 3 (chapter 6) and papers 93, 106, 178, 179, 187, 200, 201, 211, 216, 231.

e) INVERSION OF DISPLACEMENT OPERATORS: book 3 and paper 194.

f) SOLUTION WITH LIFTING TECHNIQUES: papers 192, 226, 238.

g) SOLUTION WITH PRECONDITIONED CONJUGATE GRADIENT METHOD: papers 94, 128.

h) UNIFICATION OF SUPERFAST ALGORITHMS: book 3 and papers 71, 76, 105, 140, 149, 155, 158, 168, 253, 265.

i) OTHER METHODS: book 2 and 3 and papers 62, 72, 74, 81, 101, 131-133, 165.

j) APPLICATIONS TO POLYNOMIAL GCD AND RATIONAL INTERPOLATION: papers 133, 148, 158, 166, 182, 247, 248, 253, 261, 265.

13. DETERMINANT AND CHARACTERISTIC POLYNOMIAL: papers 60, 65, 67, 143, 159, 160, 180, 197, 205, 208, 221.

14. ROOT-FINDING FOR POLYNOMIALS.

a) Book: item 4

b) SURVEYS: items 8, 9, 16, 18 and 22 in the list of survey articles and book chapters.

c) NEARLY OPTIMAL DIVIDE-AND-CONQUER ALGORITHMS: papers 126, 129, 171, 183, 184, 186, 191 and book 4 (chapter 15).

d) STRUCTURED MATRIX METHODS: papers 198, 202, 207, 210, 233, 234, 236, 239, 243, 252, 259.

e) REAL POLYNOMIAL ROOT-FINDERS: PAPERS 213, 233, 235, 243, 246, 252, 255, 257, 259.

g) OTHER ROOT-FINDING ALGORITHMS: papers 41, 46, 59, 61, 68, 99, 114, 116, 124, 130, 134, 135, 169, 171, 177, 233, 235, 241-243, 250, 260, 264.

h) APPLICATION TO APPROXIMATE POLYNOMIAL GCD: papers 148, 182.

15. ROOT-FINDING FOR SYSTEMS OF POLYNOMIALS: papers 136, 137, 139, 144, 150, 154, 170, 176, 185, 189, 193, 197.

16. EIGEN-SOLVING: papers 64, 78, 80, 84, 96, 98, 110, 152, 164, 167, 206, 207, 212, 218, 223.

17. SYMBOLIC-NUMERICAL COMPUTATIONS (ALSO SEE PARTS 8, 12-15, and 19).

a) BOOKS AND SURVEYS: books 2 and 3 and items 4, 5, 8-11, 14-17, 19-221 in the list of PAN'S SURVEY ARTICLES AND BOOK CHAPTERS.

b) APPROXIMATE POLYNOMIAL GCD: papers 148, 182.

c) NUMERICAL COMPUTATION OF DETERMINANTS: papers 160, 180, 221.

d) RECOVERY OF A RATIONAL NUMBER FROM ITS NUMERICAL APPROXIMATION: paper 196.

e) NUMERICAL COMPUTATIONS WITH ERROR-FREE OUTPUT: papers 153, 224.

18. LINEAR RECURRENCES: paper 172.

19. RANDOMIZED PREPROCESSING AND PRECONDITIONING: papers 214, 215, 217, 219, 221, 223, 225, 228, 230, 232, 234, 237, 238, 244, 245, 256, 258, 263, 266.

2 PUBLICATIONS IN CHRONOLOGICAL ORDER

- 4 research monographs
- over 20 book chapters and survey articles
- over 170 refereed publications in journals
- over 80 refereed publications in conference proceedings

2.1 BOOKS

1. "How to Multiply Matrices Faster", Lecture Notes in Computer Science, vol. 179 (XI + 212 pages), Springer, Berlin (1984).

2. "Polynomial and Matrix Computations", Volume 1: "Fundamental Algorithms" (XVI + 415 pages) (by D. Bini and V. Y. Pan), in the series Progress in Theoretical Computer Science (R.V. Book editor), Birkhäuser, Boston (1994).

3. "Structured Matrices and Polynomials: Unified Superfast Algorithms" (XXV + 278 pages), Birkhäuser/Springer, Boston/New York (June 2001).

4. "Numerical Methods for Roots of Polynomials" (by J. M. McNamee and V. Y. Pan), Part 2 (XXII + 718 pages), Elsevier (2013).

2.2 CHAPTERS IN BOOKS AND SURVEY ARTICLES WITH SOME RESEARCH RESULTS (SELECTED FROM 22)

Items 1, 2, 3, 5, and 8 include new research results.

1. "On Methods of Computing the Values of Polynomials", Uspekhi Matematicheskikh Nauk, 21, 1 (127), 103–134 (1966). (Transl. Russian Mathematical Surveys, 21, 1 (127), 105–137 (1966).)

2. "How Can We Speed Up Matrix Multiplication?", SIAM Review, 26, 3, 393–415 (1984).

3. "Complexity of Computations with Matrices and Polynomials," SIAM Review, 34, 2, 225–262 (1992).

4. "Parallel Solution of Sparse Linear and Path Systems", in Synthesis of Parallel Algorithms (J. H. Reif, editor), Chapter 14, pp. 621–678. Morgan Kaufmann publishers, San Mateo, CA (1993).

5. "Solving a Polynomial Equation: Some History and Recent Progress", SIAM Review, 39, 2, 187–220 (1997).

6. "Solving Polynomials with Computers", American Scientist, 86, 62–69 (January-February 1998).

7. "Some Recent Algebraic/Numerical Algorithms", Electronic Proceedings of IMACS/ACA'98 (1998): http:www-troja.fjfi.cvut.cz/aca98/sessions/approximate

8. "Root–finding with Eigen-solving" (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, Y. Tang, X. Wang, and X. Yan), pages 185–210 in Symbolic–Numeric Computation (Dongming Wang and Lihong Zhi, editors), Birkhauser, Basel/Boston (2007).

9. "Fast Fourier Transform and Its Applications" (by I. Z. Emiris and V. Y. Pan, in Algorithms and Theory of Computations Handbook", Second Edition, Volume 1: General Concepts and Techniques, 1016 pp., pages 1–31 in Chapter 18 (Mikhail J. Atallah and Marina Blanton, editors), CRC Press Inc., Boca Raton, Florida (2009).

10. "Algebraic Algorithms" (by I. Z. Emiris, V. Y. Pan, and E. Tsigaridas), Chapter 10 (pages from 10–1 to 10-40) of Computing Handbook (Third edition), Volume I: Computer Science and Software Engineering (Allen B. Tucker, Teo Gonzales, and Jorge L. Diaz-Herrera, editors), Taylor and Francis Group (2014).

2.3 CHAPTERS IN BOOKS AND SURVEY ARTICLES

Subsection includes prefaces; items 1, 2, 3, 4, 5, 8 and 16 include new research results.

1. "On Methods of Computing the Values of Polynomials", Uspekhi Matematicheskikh Nauk, 21, 1 (127), 103–134 (1966). (Transl. Russian Mathematical Surveys, 21, 1 (127), 105–137 (1966).)

2. "How Can We Speed Up Matrix Multiplication?", SIAM Review, 26, 3, 393–415 (1984).

3. "Linear Systems of Algebraic Equations", in Encyclopedia of Physical Sciences and Technology, 7, 304–329 (1987), (first edition, Marvin Yelles, editor); 8, 779–804 (1992) (second edition), and 8, 617–642 (2001) (third edition, Robert A. Meyers, editor), Academic Press, San Diego, California.

4. "Complexity of Algorithms for Linear Systems of Equations", in Computer Algorithms for Solving Linear Algebraic Equations (The State of the Art), (E. Spedicato, editor), NATO ASI Series, Series F: Computer and Systems Sciences, 77, 27–56, Springer, Berlin (1991) and Academic Press, Dordrecht, the Netherlands (1992).

5. ”Complexity of Computations with Matrices and Polynomials,” SIAM Review, 34, 2, 225–262 (1992).

6. ”Parallel Solution of Sparse Linear and Path Systems”, in Synthesis of Parallel Algorithms (J. H. Reif, editor), Chapter 14, pp. 621–678. Morgan Kaufmann publishers, San Mateo, CA (1993).

7. ”Algebraic Algorithms” (by A. Diaz, E. Kaltofen and V. Y. Pan), Chapter 10 in the Computer Science and Engineering Handbook (Allen B. Tucker, Jr., editor), 226–249, CRC Press Inc., Boca Raton, Florida (1997).

8. ”Solving a Polynomial Equation: Some History and Recent Progress”, SIAM Review, 39, 2, 187–220 (1997).

9. ”Solving Polynomials with Computers”, American Scientist, 86, 62–69 (January-February 1998).

10. ”Computational Complexity of Solving Large Sparse and Large Special Linear Systems of Equations”, pp. 1–24, in ”Algorithms for Large Scale Linear Algebraic Systems: Applications in Science and Engineering” (G. Winter Althaus and E. Spedicato, editors), NATO Advanced Science Institute Series, Kluwer Academic Publishers, Dordrecht, The Netherlands (1998).

11. ”Some Recent Algebraic/Numerical Algorithms”, Electronic Proceedings of IMACS/ACA’98 (1998): http:www-troja.fjfi.cvut.cz/aca98/sessions/approximate

12. ”Algebraic Algorithms” (by A. Diaz, I. Z. Emiris, E. Kaltofen and V. Y. Pan), Chapter 16 in Handbook ”Algorithms and Theory of Computations”, pp. 16–1 to 16–27 (M. Atallah, editor), CRC Press Inc., Boca Raton, Florida (1999).

13. ”Fast Fourier Transform and Its Applications” (by I. Z. Emiris and V. Y. Pan), Chapter 17 in Handbook ”Algorithms and Theory of Computations”, pp. 17–1 to 17–30 (M. Atallah, editor), CRC Press Inc., Boca Raton, Florida (1999).

14. ”Algebraic Algorithms” (by A. Diaz, E. Kaltofen and V. Y. Pan), Chapter 8 in the Computer Science and Engineering Handbook (Allen B. Tucker, editor), pp. 8–1 to 8–24, Chapman and Hall/CRC Press, 2004.

15. “Preface to the Special Issue on Algebraic and Numerical Algorithms” (by I. Z. Emiris, B. Mourrain, and V. Y. Pan), Theoretical Computer Science, 315, 2–3, 307–308 (2004).

16. “Root–finding with Eigen-solving” (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, Y. Tang, X. Wang, and X. Yan), pages 185–210 in Symbolic–Numeric Computation (Dongming Wang and Lihong Zhi, editors), Birkhauser, Basel/Boston (2007).

17. “Preface to the Special Issue on Symbolic–Numerical Algorithms” (by D. A. Bini, V. Y. Pan, and J. Verschelde), Theoretical Computer Science, 409, 2, 155–157 (2008).

18. “Algebraic and Numerical Algorithms” (by I. Z. Emiris, V. Y. Pan, and E. Tsigaridas), in Algorithms and Theory of Computations Handbook”, Second Edition, Volume 1: General Concepts and Techniques, 1016 pp., pages 1–34 in Chapter 17 (Mikhail J. Atallah and Marina Blanton, editors), CRC Press Inc., Boca Raton, Florida (2009).

19. ”Fast Fourier Transform and Its Applications” (by I. Z. Emiris and V. Y. Pan), in Algorithms and Theory of Computations Handbook”, Second Edition, Volume 1: General Concepts and Techniques, 1016 pp., pages 1–31 in Chapter 18 (Mikhail J. Atallah and Marina Blanton, editors), CRC Press Inc., Boca Raton, Florida (2009).

20. “Preface to the Special Issue on Symbolic and Numerical Algorithms” (by I. S. Kotsireas, B. Mourrain, and V. Y. Pan), Theoretical Computer Science, 412, 16, 1443–1444 (2011).

21. “Preface to the Special Issue on Symbolic and Numerical Algorithms” (by I. S. Kotsireas, B. Mourrain, V. Y. Pan, and L. Zhi), Theoretical Computer Science, 479, 1–3 (2013).

22. “Algebraic Algorithms” (by I. Z. Emiris, V. Y. Pan, and E. Tsigaridas), Chapter 10 (pages from 10–1 to 10-40) of Computing Handbook (Third edition), Volume I: Computer Science and Software Engineering (Allen B. Tucker, Teo Gonzales, and Jorge L. Diaz-Herrera, editors), Taylor and Francis Group, 2014.

2.4 RESEARCH PAPERS (in journals and refereed proceedings of conferences). 30 SELECTED FROM 266

1. ”Strassen’s Algorithm Is Not Optimal. Trilinear Technique of Aggregating, Uniting and Canceling for Constructing Fast Algorithms for Matrix Multiplication”, Proceedings of the 19th Annual IEEE Symposium on Foundations of Computer Science (FOCS’78), 166–176, IEEE Computer Society Press, Long Beach, California (1978). Journal version: ”New Fast Algorithms for Matrix Operations”, SlAM J. on Computing, 9, 2, 321–342 (1980).

2. ”Methods of Aggregations” (by W. L. Miranker and V. Y. Pan), Linear Algebra and Its Applications, 29, 231–257 (1980).

3. ”New Combinations of Methods for the Acceleration of Matrix Multiplications”, Computers and Mathematics (with Applications), 7, 73–125 (1981).

4. ”Trilinear Aggregating with Implicit Canceling for a New Acceleration of Matrix Multiplication”, Computers and Math. (with Applications), 8, 1, 23–34 (1982).

5. ”Complexity of Parallel Matrix Computations”, Theoretical Computer Science, 54, 65–85 (1987).

6. ”On Computations with Dense Structured Matrices”, Math. Comp., 55, 191, 179–190 (1990). Proceedings version in ISSAC 1989.

7. ”An Improved Newton Iteration for the Generalized Inverse of a Matrix, with Applications” (by V. Y. Pan and R. Schreiber), SIAM J. on Scientific and Statistical Computing, 12, 5, 1109–1131 (1991).

8. ”On Practical Algorithms for Accelerated Matrix Multiplication” (by J. Laderman, V. Y. Pan and H. X. Sha), Linear Algebra and Its Applications, 162–164, 557–588 (1992).

9. ”Efficient Parallel Algorithms for Computing All Pair Shortest Paths in Directed Graphs” (by Y. Han, V. Y. Pan and J. Reif), Proc. 4th Ann. ACM Symp. on Parallel Algorithms and Architectures (SPAA’92), 353–362, ACM Press, New York (1992).

10. ”Fast and Efficient Parallel Solution of Sparse Linear Systems” (by V. Y. Pan and J. Reif), SIAM J. on Computing, 22, 6, 1227–1250 (1993). Proceedings version in STOC 1985.

11. ”Optimal and Nearly Optimal Algorithms for Approximating Polynomial Zeros”, Computers and Math. (with Applications), 31, 12, 97–138 (1996). Proceedings version: ”Optimal (up to Polylog Factors) Sequential and Parallel Algorithms for Approximating Complex Polynomial Zeros”, Proc. 27th Ann. ACM Symposium on Theory of Computing (STOC’95), 741–750, ACM Press, New York (1995).

12. ”Planar Integer Linear Programming Is NC-equivalent to Euclidean GCD” (by D. F. Shallcross, V. Y. Pan and Y. Lin-Kriz), SIAM Journal on Computing, 27, 4, 960–971 (1998).

13. “Fast Rectangular Matrix Multiplication and Applications” (by X. Huang and V. Y. Pan), J. of Complexity, 14, 257-299 (1998). Proceedings version in PASCO 1997.

14. “Approximating Complex Polynomial Zeros: Modified Quadtree (Weyl’s) Construction and Improved Newton’s Iteration”, J. of Complexity, 16, 1, 213–264 (2000).

15. “Multivariate Polynomials, Duality and Structured Matrices” (by B. Mourrain and V. Y. Pan), J. of Complexity, 16, 1, 110–180 (2000).

16. “Univariate Polynomials: Nearly Optimal Algorithms for Numerical Factorization and Root-Finding”, J. of Symbolic Computation, 33, 5, 701–733 (2002). Proceedings version in ISSAC 2001.

17. “Inversion of Displacement Operators” (by V. Y. Pan and X. Wang), SIAM J. on Matrix Analysis and Applications, 24, 3, 660–677 (2003).

18. “Inverse Power and Durand-Kerner Iteration for Univariate Polynomial Root-Finding” (by D. A. Bini, L. Gemignani and V. Y. Pan), Computers and Mathematics (with Applications), 47, 2/3, 447–459 (2004).

19. “Fast and Stable QR Eigenvalue Algorithms for Generalized Semiseparable Matrices and Secular Equation” (by D. A. Bini, L. Gemignani and V. Y. Pan), Numerische Mathematik, 3, 373–408 (2005).

20. “Improved Algorithms for Computing Determinants and Resultants” (by I. Z. Emiris and V. Y. Pan), J. of Complexity, 21, 1, 43–71 (2005).

21. “Homotopic Residual Correction Algorithms for General and Structures Matrices” (by V. Y. Pan, M. Kunin, R. Rosholt, and H. Kodal), Math. of Computation, 75, 345–368 (2006).

22. “Degeneration of Integer Matrices Modulo an Integer” (by V. Y. Pan and X. Wang), Linear Algebra and Its Applications, 429, 2113–2130 (2008).

23. “Solving Homogeneous Linear Systems with Randomized Preprocessing” (by V. Y. Pan and G. Qian), Linear Algebra and Its Applications, 432, 3272–3318 (2010).

24. “New Progress in Real and Complex Polynomial Root–Finding” (by V. Y. Pan and A.–L. Zheng), Computers and Math. (with Applications), 61, 1305–1334 (2011).

25. “Solving Linear Systems of Equations with Randomization, Augmentation and Aggregation” (by V. Y. Pan and G. Qian), Linear Algebra and Its Applications”, 437, 2851–2876 (2012).

26. “Randomized Preconditioning versus Pivoting” (by V. Y. Pan, G. Qian, and A.-L. Zheng), Linear Algebra and Its Applications, 438, 4, 1883–1889 (2013).

27. “Transformations of Matrix Structures Work Again”, Linear Algebra and Its Applications, 465, 1?-32 (2015).

28. “Random Multipliers Numerically Stabilize Gaussian and Block Gaussian Elimination: Proofs and an Extension to Low-rank Approximation”, Linear Algebra and Its Applications, 481, 202–234 (2015).

29. “Nearly Optimal Refinement of Real Roots of a Univariate Polynomial” by Victor Y. Pan and Elias Tsigaridas, J. of Symbolic Computations, 74, 181–204 (2016).

30. “How Bad Are Vandermonde Matrices?”, SIAM Journal of Matrix Analysis, 37, 2, 676–694 (2016).

2.5 RESEARCH PAPERS (in journals and refereed proceedings of conferences). 70 SELECTED FROM 266

1. ”Strassen’s Algorithm Is Not Optimal. Trilinear Technique of Aggregating, Uniting and Canceling for Constructing Fast Algorithms for Matrix Multiplication”, Proceedings of the 19th Annual IEEE Symposium on Foundations of Computer Science (FOCS’78), 166–176, IEEE Computer Society Press, Long Beach, California (1978).

2. ”Fields Extension and Trilinear Aggregating, Uniting and Canceling for the Acceleration of Matrix Multiplication”, Proceedings of the 20th Annual IEEE Symposium on Foundations of Computer Science (FOCS’79), 28–38, IEEE Computer Society Press, Long Beach, California (1979).

3. ”Methods of Aggregations” (by W. L. Miranker and V. Y. Pan), Linear Algebra and Its Applications, 29, 231–257 (1980).

4. ”New Fast Algorithms for Matrix Operations”, SlAM J. on Computing, 9, 2, 321–342 (1980).

5. ”New Combinations of Methods for the Acceleration of Matrix Multiplications”, Computers and Mathematics (with Applications), 7, 73–125 (1981).

6. ”Trilinear Aggregating with Implicit Canceling for a New Acceleration of Matrix Multiplication”, Computers and Math. (with Applications), 8, 1, 23–34 (1982).

7. ”Polynomial Division and Its Computational Complexity” (by D. Bini and V. Y. Pan), Journal of Complexity, 2, 179–203 (1986).

8. ”Complexity of Parallel Matrix Computations”, Theoretical Computer Science, 54, 65–85 (1987).

9. ”Improved Processor Bounds for Combinatorial Problems in RNC” (by Z. Galil and V. Y. Pan), Combinatorica, 8, 2, 189–200 (1988).

10. ”Fast and Efficient Solution of Path Algebra Problems” (by V. Y. Pan and J. Reif), Journal of Computer and Systems Sciences, 38, 3, 494–510 (1989).

11. ”On Computations with Dense Structured Matrices”, Math. Comp., 55, 191, 179–190 (1990). Proceedings version in ISSAC 1989.

12. ”Processor Efficient Parallel Solution of Linear Systems over an Abstract Field” (by E. Kaltofen and V. Y. Pan), Proc. 3rd Ann. ACM Symp. on Parallel Algorithms and Architectures (SPAA’91), 180–191, ACM Press, New York (1991).

13. ”An Improved Newton Iteration for the Generalized Inverse of a Matrix, with Applications” (by V. Y. Pan and R. Schreiber), SIAM J. on Scientific and Statistical Computing, 12, 5, 1109–1131 (1991).

14. ”Parametrization of Newton’s Iteration for Computations with Structured Matrices and Applications”, Computers and Mathematics (with Applications), 24, 3, 61–75 (1992).

15. ”Compact Multigrid” (by V. Y. Pan and J. Reif), SIAM J. on Scientific and Statistical Computing, 13, 1, 119–127 (1992).

16. ”Parallel Solution of Toeplitz-like Linear Systems”, J. of Complexity, 8, 1–21 (1992).

17. ”A Fast, Preconditioned Conjugate Gradient Toeplitz Solver” (by V. Y. Pan and R. Schreiber), Computers and Math. (with Applications), 24, 7, 17–24 (1992).

18. "On Practical Algorithms for Accelerated Matrix Multiplication" (by J. Laderman, V. Y. Pan and H. X. Sha), Linear Algebra and Its Applications, 162–164, 557–588 (1992).

19. "Practical Improvement of the Divide-and-Conquer Eigenvalue Algorithms" (by D. Bini and V. Y. Pan), Computing, 48, 109–123 (1992). Proceedings version in SODA 1991.

20. "Processor-Efficient Parallel Solution of Linear Systems II. The Positive Characteristic and Singular Cases" (by E. Kaltofen and V. Y. Pan), Proc. of 33rd Ann. IEEE Symp. on Foundations of Computer Science (FOCS'92), 714–723, IEEE Computer Society Press, Los Alamitos, California (1992).

21. "Concurrent Iterative Algorithm for Toeplitz-like Linear Systems", IEEE Trans. on Parallel and Distributed Systems, 4, 5, 592–600 (1993).

22. "Fast and Efficient Parallel Solution of Sparse Linear Systems" (by V. Y. Pan and J. Reif), SIAM J. on Computing, 22, 6, 1227–1250 (1993). Proceedings version in STOC 1985.

23. "Decreasing the Displacement Rank of a Matrix", SIAM J. on Matrix Analysis, 14, 1, 118–121 (1993).

24. "A New Algorithm for the Symmetric Tridiagonal Eigenvalue Problem" (by V. Y. Pan and J. Demmel), Journal of Complexity, 9, 387–405 (1993).

25. "Improved Parallel Polynomial Division" (by D. Bini and V. Y. Pan), SIAM J. on Computing, 22, 3, 617–627 (1993). Proceedings version in FOCS 1992.

26. "Fast and Efficient Parallel Solution of Sparse Linear Systems" (by V. Y. Pan and J. Reif), SIAM J. on Computing, 22, 6, 1227–1250 (1993). Proceedings version in STOC 1985.

27. "New Resultant Inequalities and Complex Polynomial Factorization", SIAM Journal on Computing 23, 5, 934–950 (1994).

28. "An Algebraic Approach to Approximate Evaluation of a Polynomial on a Set of Real Points", Advances in Computational Mathematics, 3, 41–58 (1995).

29. "Work-Preserving Speed-up of Parallel Matrix Computations" (by V. Y. Pan and F. P. Preparata), SIAM J. on Computing, 24, 4, 811–821 (1995). Proceedings version in SPAA 1992.

30. "Optimal (up to Polylog Factors) Sequential and Parallel Algorithms for Approximating Complex Polynomial Zeros", Proc. 27th Ann. ACM Symposium on Theory of Computing (STOC'95), 741–750, ACM Press, New York (1995).

31. "Optimal and Nearly Optimal Algorithms for Approximating Polynomial Zeros", Computers and Math. (with Applications), 31, 12, 97–138 (1996).

32. "Parallel Computation of Polynomial GCD and Some Related Parallel Computations over Abstract Fields", Theoretical Computer Science, 162, 2, 173-223 (1996).

33. ”Efficient Parallel Algorithms for Computing All Pair Shortest Paths in Directed Graphs” (by Y. Han, V. Y. Pan and J. Reif), Algorithmica, 17, 399–415 (1997).

34. “Planar Integer Linear Programming Is NC-equivalent to Euclidean GCD” (by D. F. Shallcross, V. Y. Pan and Y. Lin-Kriz), SIAM Journal on Computing, 27, 4, 960–971 (1998). Proceedings version in FOCS 1993.

35. “Computing Matrix Eigenvalues and Polynomial Zeros Where the Output Is Real” (by D. Bini and V. Y. Pan), SIAM J. on Computing, 27, 4, 1099–1115 (1998). Proceedings version in SODA 1991.

36. “Fast Rectangular Matrix Multiplication and Applications” (by X. Huang and V. Y. Pan), J. of Complexity, 14, 257–299 (1998). Proceedings version in PASCO 1997.

37. “A Unified Superfast Algorithm for Boundary Rational Tangential Interpolation Problem and for Inversion and Factorization of Dense Structured Matrices” (by V. Olshevsky and V. Y. Pan), Proc. 39th Annual IEEE Symposium on Foundation of Computer Science (FOCS’98), 192–201, IEEE Computer Society Press, Los Alamitos, California (1998).

38. ‘Sign Determination in Residue Number Systems” (by H. Brönnimann, I. Z. Emiris, V. Y. Pan and S. Pion), Theoretical Computer Science, 210, 1, 173–197 (1999).

39. “Newton’s Iteration for Structured Matrices and Linear Systems of Equations” (by V. Y. Pan, S. Branham, R. Rosholt, and A. Zheng), SIAM volume on Fast Reliable Algorithms for Matrices with Structure (T. Kailath and A. H. Sayed, editors), ch. 7, pp. 189–210, SIAM Publications, Philadelphia (1999).

40. “Approximating Complex Polynomial Zeros: Modified Quadtree (Weyl’s) Construction and Improved Newton’s Iteration”, J. of Complexity, 16, 1, 213–264 (2000).

41. “Multivariate Polynomials, Duality and Structured Matrices” (by B. Mourrain and V. Y. Pan), J. of Complexity, 16, 1, 110–180 (2000).

42. “New Techniques for the Computation of Linear Recurrence Coefficients”, Finite Fields and Their Applications, 6, 93-=118 (2000).

43. “Computation of a Specified Root of a Polynomial System of Equations Using Eigenvectors” (by D. Bondyfalat, B. Mourrain, and V. Y. Pan), Linear Algebra and Its Applications, 319, 193–209 (2000).

44. “Certification of Numerical Computation of the Sign of the Determinant of a Matrix” (by V. Y. Pan and Y. Yu), Algorithmica, 30, 708–724 (2001).

45. “Numerical Computation of a Polynomial GCD and Extensions”, Information and Computation, 167, 2, 71–85 (2001).

46. “Structured Matrices and Newton’s Iteration: Unified Approach” (by V. Y. Pan, Y. Rami and X. Wang), Linear Algebra and Its Applications, 343/344, 233–265 (2002).

47. “Symbolic and Numerical Methods for Exploiting Structure in Constructing Resultant Matrices” (by I. Z. Emiris and V. Y. Pan), Journal of Symbolic Computation, 33, 393–413 (2002).

48. “Univariate Polynomials: Nearly Optimal Algorithms for Numerical Factorization and Root-Finding”, J. of Symbolic Computation, 33, 5, 701–733 (2002).

49. “Accelerated Solution of Multivariate Polynomial Systems of Equations” (by B. Mourrain, V. Y. Pan and O. Ruatta), SIAM J. on Computing, 32, 2, 435–454 (2003).

50. “Inversion of Displacement Operators” (by V. Y. Pan and X. Wang), SIAM J. on Matrix Analysis and Applications, 24, 3, 660–677 (2003).

51. “Inverse Power and Durand-Kerner Iteration for Univariate Polynomial Root-Finding” (by D. A. Bini, L. Gemignani and V. Y. Pan), Computers and Mathematics (with Applications), 47, 2/3, 447–459 (2004).

52. “Fast and Stable QR Eigenvalue Algorithms for Generalized Semiseparable Matrices and Secular Equation” (by D. A. Bini, L. Gemignani and V. Y. Pan), Numerische Mathematik, 3, 373–408 (2005).

53. “Homotopic Residual Correction Algorithms for General and Structures Matrices” (by V. Y. Pan, M. Kunin, R. Rosholt, and H. Kodal), Math. of Computation, 75, 345–368 (2006).

54. “Degeneration of Integer Matrices Modulo an Integer” (by V. Y. Pan and X. Wang), Linear Algebra and Its Applications, 429, 2113–2130 (2008).

55. “Additive Preconditioning for Matrix Computations” (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, Y. Tang, and X. Yan), in Proc. of the Third International Computer Science Symposium in Russia (CSR’2008), Lecture Notes in Computer Science (LNCS), 5010, 372–383 (2008).

56. “Solving Homogeneous Linear Systems with Randomized Preprocessing” (by V. Y. Pan and G. Qian), Linear Algebra and Its Applications, 432, 3272–3318 (2010).

57. “Additive Preconditioning for Matrix Computations” (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, Y. Tang, and X. Yan), Linear Algebra and Its Applications, 432, 1070–1089 (2010).

58. “Newton’s Iteration for Matrix Inversion, Advances and Extensions”, pp. 364–381, in MATRIX METHODS: THEORY, ALGORITHMS AND APPLICATIONS (dedicated to the Memory of Gene Golub, edited by Vadim Olshevsky and Eugene Tyrtyshnikov), World Scientific Publishing, New Jersey, ISBN-13 978-981-283-601-4, ISBN-10-981-283-601-2 (2010).

59. “Advancing Matrix Computations with Randomized Preprocessing” (by V. Y. Pan, G. Qian, and A.–L. Zheng), in Proc. of the Fifth International Computer Science Symposium in Russia (CSR’2010), Kazan, Russia, June 2010 (Farid Ablaev and Ernst W. Mayr, editors), Lecture Notes in Computer Science (LNCS), pages 303–314, Springer, Berlin (2010).

60. “Randomized Preconditioning of the MBA Algorithm” (by V. Y. Pan, G. Qian, and A.–L. Zheng), in Proc. International Symp. on Symbolic and Algebraic Computation (ISSAC’2011), San Jose, California, June 2011 (edited by Anton Leykin), 281–288, ACM Press, New York (2011).

61. “New Progress in Real and Complex Polynomial Root–Finding” (by V. Y. Pan and A.–L. Zheng), Computers and Math. (with Applications), 61, 1305–1334 (2011).

62. “Solving Linear Systems of Equations with Randomization, Augmentation and Aggregation” (by V. Y. Pan and G. Qian), Linear Algebra and Its Applications”, 437, 2851–2876 (2012).

63. “Randomized Preconditioning versus Pivoting” (by V. Y. Pan, G. Qian, and A.-L. Zheng), Linear Algebra and Its Applications, 438, 4, 1883–1889 (2013).

64. “Fast Approximate Computations with Cauchy Matrices, Polynomials and Rational Functions”, Proc. of the Ninth International Computer Science Symposium in Russia (CSR’2014), (E. A. Hirsch et al., editors), Moscow, Russia, June 2014, Lecture Notes in Computer Science (LNCS), 8476, pp. 287–300, Springer International Publishing, Switzerland (2014).

65. “Estimating the Norms of Circulant and Toeplitz Random Matrices and Their Inverses” (by V. Y. Pan, J. Svadlenka, and L. Zhao), Linear Algebra and Its Applications, 468, 197–210 (2015).

66. “Transformations of Matrix Structures Work Again”, Linear Algebra and Its Applications, 465, 1–32 (2015).

67. “Random Multipliers Numerically Stabilize Gaussian and Block Gaussian Elimination: Proofs and an Extension to Low-rank Approximation”, 481, 202–234 (2015).

68. “Low-rank Approximation of a Matrix: Novel Insights, New Progress, and Extensions” by Victor Y. Pan and Liang Zhao, Proc. of the Eleventh International Computer Science Symposium in Russia (CSR’2016), (Alexander Kulikov and Gerhard Woeginger, editors), St. Petersburg, Russia, June 2016, Lecture Notes in Computer Science (LNCS), Volume 9691, 352–366, Springer International Publishing, Switzerland (2016).

69. “Nearly Optimal Refinement of Real Roots of a Univariate Polynomial” by Victor Y. Pan and Elias Tsigaridas, J. of Symbolic Computations, 74, 181–204 (2016).

70. “How Bad Are Vandermonde Matrices?”, SIAM Journal of Matrix Analysis, 37, 2, 676–694 (2016).

2.6 ALL RESEARCH PAPERS (in journals and refereed proceedings of conferences).

1. ”On One Question by N.N. Luzin”, Nauchnye Doklady Vysshey Schkoly, Phiziko-Matematicheskie Nauki (in Russian), 4, 59–62 (1958).

2. ”Some Schemes for the Evaluation of Polynomials with Real Coefficients”, Doklady Akademii Nauk SSSR (in Russian), 127, 2, 266–269 (1959).

3. ”On Approximation of Analytic Functions by Rational Ones”, Uspekhi Matematicheskikh Nauk (in Russian), 16, 5 (101), 195–197 (1961).

4. ”Some Schemes for the Evaluation of Polynomials with Real Coefficients” Problemy Kibernetiki (in Russian), (edited by A.A. Lyapunov), 5, 17–29 (1961). (Transl. Problems of Cybernetics, USSR, 5, 14–32, Pergamon Press (1961).)

5. "On Some Methods of Computing Polynomial Values", Problemy Kibernetiki (in Russian), (edited by A.A. Lyapunov), 7, 21–30 (1962). (Transl. Problems of Cybernetics, USSR, 7, 20–30, U.S. Dept. of Commerce (1962).)

6. "Schemes with Preconditioning for the Evaluation of Polynomials and a Program for Automatic Preconditioning", Zhurnal Vychislitel'noy Matematiki i Matematicheskoy Fiziki (in Russian), 2, 1, 133–140 (1962). (Transl. from USSR Computational Mathematics and Mathematical Physics, 1, 137–146 (1963).).

7. "Methods for Computing Polynomials" (in Russian), Ph.D. thesis, Dept. of Mechanics and Mathematics, Moscow State University (1964).

8. "The Evaluation of Polynomials of the Fifth and Seventh Degrees with Real Coefficients", Zhurnal Vychislitel'noy Matematiki i Matematicheskoy Fiziki (in Russian), 5, 1, 116–118 (1965). (Transl. USSR Computational Mathematics and Mathematical Physics, 5, 1, 159–161 (1965).)

9. "On Simultaneous Evaluation of Several Polynomials of Low Degree (Two to Five)", Zhurnal Vychislitel'noy Matematiki i Matematicheskoy Fiziki (in Russian), 6, 2, 352–357 (1966). (Transl. USSR Computational Mathematics and Mathematical Physics, 6, 2, 222–227 (1966).)

10. "On Methods of Computing the Values of Polynomials", Uspekhi Matematicheskikh Nauk (in Russian), 21, 1 (127), 103–134 (1966). (Transl. Russian Mathematical Surveys, 21, 1 (127), 105–137 (1966).)

11. "Calculus of Rational Costs Based on Modern Economic Information" (by V. Belkin, A. Kronrod, Y. Nazarov and V. Y. Pan), Ekonomika i Matematicheskie Metody (in Russian), Akademiya Nauk SSSR, 1, 5, 699–717 (1965).

12. "A Linear Model and Algorithm for Optimizing Foreign Trade", Tezisy Dokladov i Vystupleniy na Simpoziume po Modelirovaniyu Narodnogo Khozyaistva, Institut Ekonomiki AN SSSR (Proceedings of the Symposium on Models of Public Economy, Institute of Economics, Academy of Sciences of USSR), (in Russian), Moscow, 29–37 (1970).

13. "On Solving a Distribution Problem with Upper Bounds on the Variables and a Simplified Criterion for Optimizing Foreign Trade", Trudy 4-oy Zimney Schkoly po Matematicheskomu Programmirovaniyu i Smezhnym Voprosam (in Russian), (Transactions of the 4-th Winter School on Mathematical Programming and Adjacent Problems), (edited by S. I. Zukhovitskiy), Iss. 5, 26–49, Drogobych (1972).

14. "On Schemes for the Evaluation of Products and Inverses of Matrices", Uspekhi Matematicheskikh Nauk (in Russian), 27, 5 (167), 249–250 (1972).

15. "Models for Planning Costs with Optimization of Foreign Trade of Several Countries under the Economic Integration", Primenenie Ekonomiko–Matematicheskikh Modeley i EVM pri Planirovanii i Prognozirovanii Tsen (in Russian), 5 (1973).

16. "A Model for the Optimization of Foreign Economic Relations Under the Economic Integration of the Socialist Countries", Ekonomika i Matematicheskie Metody (in Russian), Akademiya Nauk SSSR, 10, 2, 255–266 (1974). (Transl. USSR Trade and Services, 755, 1–16 (1974).)

17. "A Model for the Dynamics of Costs and Expenditures", Trudy Mezhdunarodnoy Konferentsii "Modelirovanie Ekonomicheskikh Protsessov" (Transactions of the International Conference, "Models of Economic Processes"), (in Russian), Erevan, 166–174 (1974).

18. "A Modification of a Balanced Model of Income–Commodities into an Equilibrium Model" (by V. Belkin, V. Ivanter, N. Konstantinov and V. Pan), Ekonomika i Matematicheskie Methody, Akademiya Nauk SSSR (in Russian), 11, 6, 1037–1049 (1975).

19. "Computational Complexity of Computing Polynomials over the Fields of Real and Complex Numbers", Proceedings of the Tenth Annual ACM Symposium on Theory of Computing (STOC'78), 162–172, ACM Press, New York (1978).

20. "Strassen's Algorithm Is Not Optimal. Trilinear Technique of Aggregating, Uniting and Canceling for Constructing Fast Algorithms for Matrix Multiplication", Proceedings of the 19th Annual IEEE Symposium on Foundations of Computer Science (FOCS'78), 166–176, IEEE Computer Society Press, Long Beach, California (1978).

21. "Fields Extension and Trilinear Aggregating, Uniting and Canceling for the Acceleration of Matrix Multiplication", Proceedings of the 20th Annual IEEE Symposium on Foundations of Computer Science (FOCS'79), 28–38, IEEE Computer Society Press, Long Beach, California (1979).

22. "Methods of Aggregations" (by W. L. Miranker and V. Y. Pan), Linear Algebra and Its Applications, 29, 231–257 (1980).

23. "New Fast Algorithms for Matrix Operations", SlAM J. on Computing, 9, 2, 321–342 (1980).

24. "Convolution of Vectors over the Real Field of Constants", Journal of Algorithms, 1, 297–300 (1980).

25. "New Combinations of Methods for the Acceleration of Matrix Multiplications", Computers and Mathematics (with Applications), 7, 73–125 (1981).

26. "The Bit Complexity of Arithmetic Algorithms", Journal of Algorithms, 2, 144–163 (1981).

27. "A Unified Approach to the Analysis of Bilinear Algorithms", Journal of Algorithms, 2, 301–310 (1981).

28. "The Bit Operation Complexity of Matrix Multiplication and All Pair Shortest Path Problem", Computers and Math. (with Applications), 7, 5, 431–438 (1981).

29. "The Lower Bounds on the Additive Complexity of Bilinear Problems in Terms of Some Algebraic Quantities", Information Processing Letters, 13, 2, 71–72 (1981).

30. "Trilinear Aggregating with Implicit Canceling for a New Acceleration of Matrix Multiplication", Computers and Math. (with Applications), 8, 1, 23–34 (1982).

31. "The Bit Operation Complexity of Approximate Evaluation of Matrix and Polynomial Products Using Modular Arithmetic", Computers and Math. (with Applications), 8, 2, 137–140 (1982).

32. "Fast Matrix Multiplication without APA–Algorithms", Computers and Math. (with Applications), 8, 5, 343–366 (1982).

33. "Trilinear Aggregating is the Basis for the Asymptotically Fastest Known Algorithms for Matrix Multiplication", Conference Record, Second Conference on Foundations of Software Technology and Theoretical Computer Science (FST and TCS'82), 321–337, Indian Institute of Technology, Bangalore, India (December 1982).

34. "The Additive and Logical Complexities of Linear and Bilinear Algorithms", J. of Algorithms, 4, 1–34 (1983).

35. "The Projective Power Method for the Algebraic Eigenvalue Problem", Computers and Math. (with Applications), 9, 6, 735–745 (1983).

36. "Trilinear Aggregating is the Basis for the Asymptotically Fastest Known Algorithms for Matrix Multiplication" (extended abstract), Methods of Operations Research, 45, 493–494 (1983).

37. "Trilinear Aggregating and the Recent Progress in the Asymptotic Acceleration of Matrix Operations", Theoretical Computer Science, 33, 117–138 (1984).

38. ”How Fast Can We Solve a System of Linear Inequalities in the Worst and in the Average Case?”, Methods of Operations Research, 51, 107–118 (1984).

39. ”Fast Finite Methods for a System of Linear Inequalities”, Computers and Math. (with Applications), 11, 4, 355–394 (1985).

40. ”The Bit Complexity of Matrix Multiplication and of the Related Computations in Linear Algebra. The Segmented λ–algorithms”, Computers and Math. (with Applications), 11, 9, 919–928 (1985).

41. ”On Application of Some Recent Techniques of the Design of Algebraic Algorithms to the Sequential and Parallel Evaluation of the Roots of a Polynomial and to Some Other Numerical Problems”, Computers and Math. (with Applications), 11, 9, 911–917 (1985).

42. ”Fast Parallel Polynomial Division via Reduction to Polynomial Inversion Modulo a Power” (by D. Bini and V. Y. Pan), Information Processing Letters, 21, 79–81 (1985).

43. ”On the Complexity of a Pivot Step of the Revised Simplex Algorithm”, Computers and Math. (with Applications), 11, 11, 1127–1140 (1985).

44. ”Efficient Parallel Solution of Linear Systems” (by V. Y. Pan and J. Reif), Proc. 17th Ann. ACM Symp. on Theory of Computing (STOC’85), 143–152, ACM Press, New York (1985).

45. ”Improved Processor Bounds for Algebraic and Combinatorial Problems in RNC” (by Z. Galil and V. Y. Pan), Proc. 26th Ann. IEEE Symp. on Foundations of Computer Science (FOCS’85), 490–495, IEEE Computer Society Press, Los Angeles, California (1985).

46. ”Fast and Efficient Algorithms for Sequential and Parallel Evaluation of Polynomial Zeros and of Matrix Polynomials,” Proc. 26th Ann. IEEE Symp. on Foundations of Computer Science (FOCS’85), 522–531, IEEE Computer Society Press, Los Angeles, California (1985).

47. ”Fast and Efficient Parallel Algorithms for the Exact Inversion of Integer Matrices”, Proc. Fifth Conf. on Foundations of Software Technology and Theoretical Computer Science (FST and TCS’85), (edited by K. V. Nori), Lecture Notes in Computer Science, 206, 504–521, Springer, Berlin (1985).

48. ”Algorithms for Polynomial Division” (by D. Bini and V. Y. Pan), Proc. European Conference on Computer Algebra, Linz, Austria, Lecture Notes in Computer Science, 204, 1–3, Springer (1985).

49. ”The Trade-off Between the Additive Complexity and Asynchronicity of Linear and Bilinear Algorithms”, Information Processing Letters, 22, 11–14 (1986).

50. ”Fast and Efficient Parallel Linear Programming and Least Squares Computations” (by V. Y. Pan and J. Reif), VLSI Algorithms and Architectures, Lecture Notes in Computer Science, 227, 283–295, Springer, Berlin (1986).

51. ”A Logarithmic Boolean Time Algorithm for Parallel Polynomial Division” (by D. Bini and V. Y. Pan), VLSI Algorithms and Architectures, Lecture Notes in Computer Science, 227, 246–251, Springer, Berlin (1986).

52. ”Polynomial Division and Its Computational Complexity” (by D. Bini and V. Y. Pan), Journal of Complexity, 2, 179–203 (1986).

53. ”Fast Parallel Algorithms for Polynomial Division over Arbitrary Field of Constants” (by D. Bini and V. Y. Pan), Computers and Mathematics (with Applications), 12A, 11, 1105–1118 (1986).

54. ”Extension of the Parallel Nested Dissection Algorithm to the Path Algebra Problems” (by V. Y. Pan and J. Reif), Proc. Sixth Conference on Foundations of Software Technology and Theoretical Computer Science (FST and TCS’86), (New Delhi, India), Lecture Notes in Computer Science, 241, 470–487, Springer, Berlin (1986).

55. ”Fast and Efficient Linear Programming and Linear Least-Squares Computations” (by V. Y. Pan and J. Reif), Computers and Mathematics (with Applications), 12A, 12, 1217–1227 (1986).

56. ”Parallel Nested Dissection for Path Algebra Computations” (by V. Y. Pan and J. Reif), Operations Research Letters, 5, 4, 177–184 (1986).

57. ”Efficient Parallel Linear Programming” (by V. Y. Pan and J. Reif), Operations Research Letters, 5, 3, 127–135 (1986).

58. ”A Logarithmic Boolean Time Algorithm for Parallel Polynomial Division” (by D. Bini and V. Y. Pan), Information Processing Letters, 24, 233–237 (1987).

59. ”Algebraic Complexity of Computing Polynomial Zeros”, Computers and Math. (with Applications), 14, 4, 285–304 (1987).

60. ”Complexity of Parallel Matrix Computations”, Theoretical Computer Science, 54, 65–85 (1987).

61. ”Sequential and Parallel Complexity of Approximate Evaluation of Polynomial Zeros”, Computers and Mathematics (with Applications), 14, 8, 591–622 (1987).

62. ”Some Polynomial and Toeplitz Matrix Computations” (by V. Y. Pan and J. Reif), Proc. 28th Ann. IEEE Symp. on Foundations of Computer Science (FOCS'87), 173–184, IEEE Computer Society Press, Los Angeles, California (1987).

63. ”Improved Processor Bounds for Combinatorial Problems in RNC” (by Z. Galil and V. Y. Pan), Combinatorica, 8, 2, 189–200 (1988).

64. ”Efficient Algorithms for the Evaluation of the Eigenvalues of (Block) Banded Toeplitz Matrices” (by D. Bini and V. Y. Pan), Mathematics of Computation, 50, 182, 431–448 (1988).

65. ”Computing the Determinant and the Characteristic Polynomial of a Matrix via Solving Linear Systems of Equations”, Information Processing Letters, 28, 2, 71–75 (1988).

66. ”Fast and Efficient Solution of Path Algebra Problems” (by V. Y. Pan and J. Reif), Journal of Computer and Systems Sciences, 38, 3, 494–510 (1989).

67. ”Parallel Evaluation of the Determinant and of the Inverse of a Matrix” (by Z. Galil and V. Y. Pan), Information Processing Letters, 30, 41–45 (1989).

68. ”Fast and Efficient Parallel Evaluation of the Zeros of a Polynomial Having Only Real Zeros”, Computers and Mathematics (with Applications), 17, 11, 1475–1480 (1989).

69. ”Fast and Efficient Parallel Solution of Dense Linear Systems” (by V. Y. Pan and J. Reif), Computers and Math. (with Applications), 17, 11, 1481–1491 (1989).

70. ”Fast Evaluation and Interpolation at the Chebyshev Sets of Points”, Applied Math. Letters, 2, 3, 255–258 (1989).

71. ”On Some Computations with Dense Structured Matrices”, Proc. Annual ACM-SIGSAM International Symposium on Symbolic and Algebraic Computation (ISSAC'89), 34–42, ACM Press, New York (1989).

72. ”Fast and Efficient Parallel Inversion of Toeplitz and Block Toeplitz Matrices”, Operator Theory: Advances and Applications, 40, 359–389, Birkhäuser, Basel, Switzerland (1989).

73. ”On the Bit-Complexity of Discrete Solution of PDEs: Compact Multigrid” (by V. Y. Pan and J. Reif), Proc. 17th International Colloquium on Automata, Languages and Programming (ICALP'90), Springer's Lecture Notes in Computer Science, 443, 612–625 (1990).

74. ”Parallel Least-Squares Solution of General and Toeplitz–like Linear Systems”, Proc. 2nd Ann. ACM Symp. on Parallel Algorithms and Architecture (SPAA'90), 244–253, ACM Press, New York (1990).

75. "Parallel Polynomial Computations by Recursive Processes" (by D. Bini and V. Y. Pan), Proc. Annual ACM International Symposium on Symbolic and Algebraic Computation (ISSAC'90), 294, ACM Press, New York (1990).

76. "On Computations with Dense Structured Matrices", Math. Comp., 55, 191, 179–190 (1990).

77. "The Bit-Complexity of the Discrete Solution of PDEs: Compact Multigrid" (by V. Y. Pan and J. Reif), Computers and Math. (with Applications), 20, 2, 9–16 (1990).

78. "Estimating the Extremal Eigenvalues of a Symmetric Matrix", Computers and Math. (with Applications), 20, 2, 17–22 (1990).

79. "The Modified Barrier Function Method for Linear Programming and Its Extensions", Computers and Math. (with Applications), 20, 3, 1–14 (1990).

80. "Parallel Complexity of Tridiagonal Symmetric Eigenvalue Problem" (by D. Bini and V. Y. Pan), Proc. 2nd Ann. ACM-SIAM Symp. on Discrete Algorithms (SODA'91), 384–393, ACM Press, New York, and SIAM Publications, Philadelphia (1991).

81. "Improved Parallel Computations with Matrices and Polynomials" (by D. Bini, L. Gemignani and V. Y. Pan), Proc. 18th Intern. Colloquium on Automata, Languages and Programming (ICALP'91), Lecture Notes in Computer Science, 510, 520–531, Springer, Berlin (1991).

82. "Processor Efficient Parallel Solution of Linear Systems over an Abstract Field" (by E. Kaltofen and V. Y. Pan), Proc. 3rd Ann. ACM Symp. on Parallel Algorithms and Architectures (SPAA'91), 180–191, ACM Press, New York (1991).

83. "An Improved Newton Iteration for the Generalized Inverse of a Matrix, with Applications" (by V. Y. Pan and R. Schreiber), SIAM J. on Scientific and Statistical Computing, 12, 5, 1109–1131 (1991).

84. "On the Evaluation of the Eigenvalues of a Banded Toeplitz Block Matrix" (by D. Bini and V. Y. Pan), J. of Complexity, 7, 408–424 (1991).

85. "The Parallel Computation of the Minimum Cost Paths in Graphs by Stream Contraction" (by V. Y. Pan and J. Reif), Information Processing Letters, 40, 79–83 (1991).

86. "Univariate Polynomial Division with a Remainder by Means of Evaluation and Interpolation" (by V. Y. Pan, E. Landowne, and A. Sadikou), Proc. of 3rd IEEE Symp. on Parallel and Distributed Processing, 212–217, IEEE Computer Society Press, Los Alamitos, California (1991).

87. "Extended Concept of Significant Digits and Lower Precision Computations", Applied Mathematics Letters, 5, 2, 3–6 (1992).

88. "Parametrization of Newton's Iteration for Computations with Structured Matrices and Applications", Computers and Mathematics (with Applications), 24, 3, 61–75 (1992).

89. "On Parallel Complexity of Integer Linear Programming, GCD and the Iterated Mod Function" (by Yu Lin-Kriz and V. Y. Pan), Proc. 3rd Ann. ACM-SIAM Symposium on Discrete Algorithms (SODA'92), 124–137, ACM Press, New York and SIAM Publications, Philadelphia (1992).

90. "Efficient Parallel Algorithms for Computing All Pair Shortest Paths in Directed Graphs" (by Y. Han, V. Y. Pan and J. Reif), Proc. 4th Ann. ACM Symp. on Parallel Algorithms and Architectures (SPAA'92), 353–362, ACM Press, New York (1992).

91. "Supereffective Slow-down of Parallel Computations" (by V. Y. Pan and F. P. Preparata), Proc. 4th Ann. ACM Symp. on Parallel Algorithms and Architectures (SPAA'92), 402–409, ACM Press, New York (1992).

92. "Compact Multigrid" (by V. Y. Pan and J. Reif), SIAM J. on Scientific and Statistical Computing, 13, 1, 119–127 (1992).

93. "Parallel Solution of Toeplitz–like Linear Systems", J. of Complexity, 8, 1–21 (1992).

94. "A Fast, Preconditioned Conjugate Gradient Toeplitz Solver" (by V. Y. Pan and R. Schreiber), Computers and Math. (with Applications), 24, 7, 17–24 (1992).

95. "On Practical Algorithms for Accelerated Matrix Multiplication" (by J. Laderman, V. Y. Pan and H. X. Sha), Linear Algebra and Its Applications, 162–164, 557–588 (1992).

96. "Practical Improvement of the Divide-and-Conquer Eigenvalue Algorithms" (by D. Bini and V. Y. Pan), Computing, 48, 109–123 (1992).

97. "Polynomial Division with a Remainder by Means of Evaluation and Interpolation" (by V. Y. Pan, E. Landowne, and A. Sadikou), Information Processing Letters, 44, 149–153 (1992).

98. "Improving the Solution of the Symmetric Eigenvalue Problem and an Extension", Applied Mathematics Letters, 5, 6, 49–50 (1992).

99. "New Resultant Inequalities and Complex Polynomial Factorization", Proc. 1st Israel Symp. on Theory of Computing and Systems (ISTCS '92), Lecture Notes in Computer Science, 601, 122–136, Springer, Berlin (1992).

100. "Improved Parallel Computations with Toeplitz–like and Hankel–like Matrices" (by D. Bini and V. Y. Pan), Proc. of Annual ACM-SIGSAM International Symposium on Symbolic and Algebraic Computation (ISSAC'93), 193–200, ACM Press, New York (1993).

101. "The Power of Combining the Techniques of Algebraic and Numerical Computing: Improved Approximate Multipoint Polynomial Evaluation and Improved Multipole Algorithms" (by V. Y. Pan, J. Reif, and S. Tate), Proc. of 33rd Ann. IEEE Symp. on Foundations of Computer Science (FOCS '92), 703–713, IEEE Computer Society Press, Los Alamitos, California (1992).

102. "Processor-Efficient Parallel Solution of Linear Systems II. The Positive Characteristic and Singular Cases" (by E. Kaltofen and V. Y. Pan), Proc. of 33rd Ann. IEEE Symp. on Foundations of Computer Science (FOCS'92), 714–723, IEEE Computer Society Press, Los Alamitos, California (1992).

103. "Improved Parallel Polynomial Division and Its Extension" (by D. Bini and V. Y. Pan), Proc. of 33rd Ann. IEEE Symp. on Foundations of Computer Science (FOCS'92), 131–136, IEEE Computer Society Press, Los Alamitos, California (1992).

104. "Binary Segmentation for Matrix and Vector Operations", Computers and Math. (with Applications), 25, 3, 69–71 (1993).

105. "A New Approach to Fast Polynomial Interpolation and Multipoint Evaluation" (by V. Y. Pan, A. Sadikou, E. Landowne, and O. Tiga), Computers and Math. (with Applications), 25, 9, 25–30 (1993).

106. "Concurrent Iterative Algorithm for Toeplitz–like Linear Systems", IEEE Trans. on Parallel and Distributed Systems, 4, 5, 592–600 (1993).

107. "Fast and Efficient Parallel Solution of Sparse Linear Systems" (by V. Y. Pan and J. Reif), SIAM J. on Computing, 22, 6, 1227–1250 (1993).

108. "Decreasing the Displacement Rank of a Matrix", SIAM J. on Matrix Analysis, 14, 1, 118–121 (1993).

109. "Generalized Compact Multigrid" (by V. Y. Pan and J. Reif), Computers and Math. (with Applications), 25, 9, 3–5 (1993).

110. "A New Algorithm for the Symmetric Tridiagonal Eigenvalue Problem" (by V. Y. Pan and J. Demmel), Journal of Complexity, 9, 387–405 (1993).

111. "Improved Parallel Polynomial Division" (by D. Bini and V. Y. Pan), SIAM J. on Computing, 22, 3, 617–627 (1993).

112. "Improved Parallel Computations with Toeplitz–like and Hankel–like Matrices” (by D. Bini and V. Y. Pan), Linear Algebra and Its Applications, 188, 189, 3–29 (1993).

113. "The NC-Equivalence of Planar Integer Linear Programming and Euclidean GCD” (by D. Shallcross, V. Y. Pan, and Yu Lin-Kriz), Proc. 34th Ann. IEEE Symp. on Foundations of Computer Science (FOCS'93), 557–564, IEEE Computer Society Press, Los Alamitos, California (1993).

114. "New Resultant Inequalities and Complex Polynomial Factorization”, SIAM Journal on Computing 23, 5, 934–950 (1994).

115. "Improved Parallel Solution of a Triangular Linear System”, Computers and Math. (with Applications), 27, 11, 41–43 (1994).

116. "New Techniques for Approximating Complex Polynomial Zeros”, Proc. 5th Ann. ACM-SIAM Symp. on Discrete Algorithms (SODA'94), 260–270, ACM Press, New York, and SIAM Publications, Philadelphia (1994).

117. "Optimum Parallel Computations with Band Matrices” (by V. Y. Pan, I. Sobze and A. Atinkpahoun), Proc. 5th Ann. ACM-SIAM Symp. on Discrete Algorithms (SODA'94), 649–658, ACM Press, New York, and SIAM Publications, Philadelphia (1994).

118. "Simple Multivariate Polynomial Multiplication”, J. Symbolic Computation, 18, 183–186 (1994).

119. "Parallel Solution of Toeplitz and Toeplitz–like Linear Systems over Fields of Small Positive Characteristic” (by E. Kaltofen and V. Y. Pan), Proceedings of First Intern. Symposium on Parallel Symbolic Computation (PASCO'94), Linz, Austria (Sept. 1994), Lecture Notes Series in Computing, 5, 225–233, World Scientific Publishing Company, Singapore (1994).

120. "Algebraic Improvement of Numerical Algorithms: Interpolation and Economization of Taylor Series”, Mathematical and Computer Modeling, 20, 1, 23–26 (1994).

121. "An Algebraic Approach to Approximate Evaluation of a Polynomial on a Set of Real Points”, Advances in Computational Mathematics, 3, 41–58 (1995).

122. "Work-Preserving Speed-up of Parallel Matrix Computations” (by V. Y. Pan and F. P. Preparata), SIAM J. on Computing, 24, 4, 811–821 (1995).

123. "Parallel Computation of a Krylov Matrix for a Sparse and Structured Input”, Mathematical and Computer Modeling, 21, 11, 97–99 (1995).

124. "Deterministic Improvement of Complex Polynomial Factorization Based on the Properties of the Associated Resultant”, Computers and Math. (with Applications), 30, 2, 71–94 (1995).

125. "On Parallel Computations with Band Matrices” (by V. Y. Pan, I. Sobze, and A. Atinkpahoun), Information and Computation, 120, 2, 237–250 (1995).

126. "Optimal (up to Polylog Factors) Sequential and Parallel Algorithms for Approximating Complex Polynomial Zeros”, Proc. 27th Ann. ACM Symposium on Theory of Computing (STOC'95), 741–750, ACM Press, New York (1995).

127. "Weyl's Quadtree Algorithm for Unsymmetric Eigenvalue Problem”, Applied Math. Letters, 8, 5, 87–88 (1995).

128. "A Fast, Preconditioned Conjugate Gradient Toeplitz and Toeplitz–like Solver” (by V. Y. Pan, A. Zheng, O. Dias, X. Huang), Computers and Math. (with Applications), 30, 8, 57–63 (1995).

129. "Optimal and Nearly Optimal Algorithms for Approximating Polynomial Zeros”, Computers and Math. (with Applications), 31, 12, 97–138 (1996).

130. "Computing $x^n \mod p(x)$ and an Application to Splitting a Polynomial into Factors over a Fixed Disc”, Journal of Symbolic Computations, 22, 377–380 (1996).

131. "A New Approach to Parallel Computation of Polynomial GCDs and to Related Parallel Computations over Fields and Integer Rings", Proc. 7th Ann. ACM-SIAM Symposium on Discrete Algorithms (SODA'96), 518–527, ACM Press, New York, and SIAM Publications, Philadelphia (1996).

132. "Effective Parallel Computations with Toeplitz and Toeplitz–like Matrices Filled with Integers", in Proc. of the AMS-SIAM Workshop "Mathematics of Numerical Analysis", Park City, Utah, July-August 1995 (J. Renegar, M. Shub, and S. Smale, editors), Lectures in Applied Math., 32, 593–641, Amer. Math. Society Press, Providence, Rhode Island (1996).

133. "Parallel Computation of Polynomial GCD and Some Related Parallel Computations over Abstract Fields", Theoretical Computer Science, 162, 2, 173–223 (1996).

134. "On Isolation of Real and Nearly Real Zeros of a Univariate Polynomial and Its Splitting into Factors" (by V. Y. Pan, M.-h. Kim, A. Sadikou, X. Huang, and A. Zheng), J. of Complexity, 12, 572–594 (1996).

135. "Graeffe's, Chebyshev–like, and Cardinal's Processes for Splitting a Polynomial into Factors" (by D. Bini and V. Y. Pan), J. of Complexity, 12, 492–511 (1996).

136. "Multidimensional Structured Matrices and Polynomial Systems" (by B. Mourrain and V. Y. Pan), Calcolo (Special Issue on Toeplitz Matrices: Structure, Algorithms and Applications), 33, 389–401 (1996).

137. "Techniques for Exploiting Structure in Matrix Formulae of the Sparse Resultant" (by I. Z. Emiris and V. Y. Pan), Calcolo (Special Issue on Toeplitz Matrices: Structure, Algorithms and Applications), 33, 353–369 (1996).

138. "Efficient Parallel Algorithms for Computing All Pair Shortest Paths in Directed Graphs" (by Y. Han, V. Y. Pan and J. Reif), Algorithmica, 17, 399–415 (1997).

139. "Solving Special Polynomial Systems by Using Structured Matrices and Algebraic Residues" (by B. Mourrain and V. Y. Pan), Proc. of the AMS-SIAM Conference on Foundation of Computational Math. (FoCM'97), (F. Cucker and M. Shub, editors), Rio-de-Janeiro, January 1997, 287–304, Springer (1997).

140. "Fast Multipoint Polynomial Evaluation and Interpolation via Computation with Structured Matrices" (by V. Y. Pan, A. Zheng, X. Huang, and Y. Yu), Annals of Numerical Math., 4, 483–510 (1997).

141. "Newton's Iteration for Inversion of Cauchy–like and Other Structured Matrices" (by V. Y. Pan, A. Zheng, X. Huang, and O. Dias), J. of Complexity, 13, 108–124 (1997).

142. "Faster Solution of the Key Equation for Decoding the BCH Error-Correcting Codes", Proc. 29th ACM Symposium on Theory of Computing (STOC'97), 168–175, ACM Press, New York (1997).

143. "Computing Exact Geometric Predicates Using Modular Arithmetic with Single Precision" (by H. Brönnimann, I. Z. Emiris, V. Y. Pan and S. Pion), Proc. 13th Ann. ACM Symp. on Computational Geometry, 174–182, ACM Press, New York (1997).

144. "The Structure of Sparse Resultant Matrices" (by I. Z. Emiris and V. Y. Pan), Proc. Annual ACM International Symposium on Symbolic and Algebraic Computations (ISSAC'97), 189–196, ACM Press, New York (1997).

145. "Fast Rectangular Matrix Multiplication and Improving Parallel Matrix Computations" (by X. Huang and V. Y. Pan), Proc. Annual ACM International Symposium on Parallel Algebraic and Symbolic Computation (PASCO'97), 11–23, ACM Press, New York (1997).

146. "Algebraic and Numerical Techniques for the Computation of Matrix Determinants" (by V. Y. Pan, Y. Yu, and C. Stewart), Computers and Mathematics (with Appli-

cations), 34, 1, 43–70 (1997).

147. "New Fast Algorithms for Polynomial Interpolation and Evaluation on the Chebyshev Node Set", Computers and Math. (with Applications), 35, 3, 125–129 (1998).

148. "Approximate Polynomial Gcds, Padé Approximation, Polynomial Zeros, and Bipartite Graphs", Proc. 9th Ann. ACM-SIAM Symp. on Discrete Algorithms (SODA'98), 68–77, ACM Press, New York, and SIAM Publications, Philadelphia (1998).

149. "New Transformations of Cauchy Matrices and Trummer's Problem" (by V. Y. Pan, M. Abu Tabanjeh, Z. Q. Chen, E. Landowne, and A. Sadikou), Computers and Mathematics (with Applications), 35, 12, 1–5 (1998).

150. "Asymptotic Acceleration of Solving Polynomial Systems" (by B. Mourrain and V. Y. Pan), Proc. 30th Annual ACM Symp. on Theory of Computing (STOC'98), 488–496, ACM Press, New York (1998).

151. "Planar Integer Linear Programming Is NC-equivalent to Euclidean GCD" (by D. F. Shallcross, V. Y. Pan and Y. Lin-Kriz), SIAM Journal on Computing, 27, 4, 960–971 (1998).

152. "Computing Matrix Eigenvalues and Polynomial Zeros Where the Output Is Real" (by D. Bini and V. Y. Pan), SIAM J. on Computing, 27, 4, 1099–1115 (1998).

153. "Modular Arithmetic for Linear Algebra Computations in the Real Field" (by I. Z. Emiris, V. Y. Pan and Y. Yu), J. of Symbolic Computation, 21, 1–17 (1998).

154. "Controlled Iterative Methods for Solving Polynomial Systems" (by D. Bondyfalat, B. Mourrain, and V. Y. Pan), Proc. ACM Annual Intern. Symp. on Symbolic and Algebraic Comp. (ISSAC'98), 252–259, ACM Press, New York (1998).

155. "Transformations of Cauchy Matrices for Trummer's Problem and a Cauchy–like Linear Solver" (by V. Y. Pan, M. Abu Tabanjeh, Z. Chen, S. Providence and A. Sadikou), Proc. of 5th Annual International Symposium on Solving Irregularly Structured Problems in Parallel (IREGULAR'98), (A. Ferreira, J. Rolim, H. Simon, and S.-H. Teng, editors), Lecture Notes in Computer Science, 1457, 274–284, Springer, Berlin (1998).

156. "Fast Rectangular Matrix Multiplication and Applications" (by X. Huang and V. Y. Pan), J. of Complexity, 14, 257–299 (1998).

157. "Single Precision Computation of the Sign of Algebraic Predicates", Applied Math. Letters, 11, 6, 49–50 (1998).

158. "A Unified Superfast Algorithm for Boundary Rational Tangential Interpolation Problem and for Inversion and Factorization of Dense Structured Matrices" (by V. Olshevsky and V. Y. Pan), Proc. 39th Annual IEEE Symposium on Foundation of Computer Science (FOCS'98), 192–201, IEEE Computer Society Press, Los Alamitos, California (1998).

159. "Sign Determination in Residue Number Systems" (by H. Brönnimann, I. Z. Emiris, V. Y. Pan and S. Pion), Theoretical Computer Science, 210, 1, 173–197 (1999).

160. "Certified Computation of the Sign of a Matrix Determinant" (by V. Y. Pan and Y. Yu), Proc. 10th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'99), 715–724, ACM Press, New York, and SIAM Publications, Philadelphia (1999).

161. "Approximate Real Polynomial Division via Approximate Inversion of Real Triangular Toeplitz Matrices" (by V. Y. Pan and Z. Q. Chen), Applied Math. Letters, 12, 1–2 (1999).

162. "Newton's Iteration for Structured Matrices and Linear Systems of Equations" (by V. Y. Pan, S. Branham, R. Rosholt, and A. Zheng), SIAM volume on Fast Reliable Algorithms for Matrices with Structure (T. Kailath and A. H. Sayed, editors), ch. 7, pp. 189–210, SIAM Publications, Philadelphia (1999).

163. “Parallel Matrix Multiplication on a Linear Array with a Reconfigurable Pipelined Bus System” (by K. Li and V. Y. Pan), Proc. 13th Intern. Parallel Processing Symp. and 10th Symp. on Parallel and Distributed Computing (IPPS/SPDP 1999), 31–35, IEEE Computer Soc. Press, Los Alamitos, California (April 1999).

164. “The Complexity of the Matrix Eigenproblem” (by V. Y. Pan and Z. Chen), Proc. 31st Annual ACM Symposium on Theory of Computing (STOC’99), 507–516, ACM Press, New York (1999).

165. “Superfast Computations with Singular Structured Matrices over Abstract Fields” (by V. Y. Pan, A. Zheng, M. Abutabanjeh, Z. Chen, and S. Providence), Proc. Second Workshop on Computer Algebra in Scientific Computing (CASC’99), (V. G. Ganzha, E. W. Mayr, E. V. Vorozhtsov, Editors), 323–338, Springer (May 1999).

166. “Polynomial and Rational Interpolation and Multipoint Evaluation (with Structured Matrices)” (by V. Olshevsky and V. Y. Pan), Proc. 26th Intern. Colloquium on Automata, Languages and Programming (ICALP’99), 1644, 585–594, Springer’s Lecture Notes in Computer Science, Springer, Berlin (July 1999).

167. “A New Approach to Bisection Acceleration for the Symmetric Tridiagonal Eigenvalue Problem” (by V. Y. Pan and E. Linzer), Numerical Algorithms, 22, 13–39 (1999).

168. “Nearly Optimal Computations with Structured Matrices”, Proc. of 11th Ann. ACM-SIAM Symposium on Discrete Algorithms (SODA’2000), 953–962, ACM Press, New York, and SIAM Publications, Philadelphia (January 2000).

169. “Approximating Complex Polynomial Zeros: Modified Quadtree (Weyl’s) Construction and Improved Newton’s Iteration”, J. of Complexity, 16, 1, 213–264 (2000).

170. “Multivariate Polynomials, Duality and Structured Matrices” (by B. Mourrain and V. Y. Pan), J. of Complexity, 16, 1, 110–180 (2000).

171. “Lifting/Descending Processes for Polynomial Zeros and Applications” (by B. Mourrain and V. Y. Pan), J. of Complexity, 16, 1, 265–273 (2000).

172. “New Techniques for the Computation of Linear Recurrence Coefficients”, Finite Fields and Their Applications, 6, 93–118 (2000).

173. “Superfast Algorithms for Cauchy–like Matrix Computations and Extensions” (by V. Y. Pan and A. Zheng), Linear Algebra and Its Applications, 310, 83–108 (2000).

174. “Matrix Structure, Polynomial Arithmetic, and Erasure-Resilient Encoding and Decoding”, Proceedings of International Symposium on Symbolic and Algebraic Computations (ISSAC’2000), 266–271, ACM Press, New York (2000).

175. “Parallel Complexity of Computations with General and Toeplitz–like Matrices Filled with Integers”, SIAM J. on Computing, 30, 1080–1125 (2000).

176. “Computation of a Specified Root of a Polynomial System of Equations Using Eigenvectors” (by D. Bondyfalat, B. Mourrain, and V. Y. Pan), Linear Algebra and Its Applications, 319, 193–209 (2000).

177. “A New Proximity Test for Polynomial Zeros”, Computers and Math. (with Applications), 41, 12, 1559–1560 (2001).

178. “A Homotopic Residual Correction Process”, Proc. of the Second Conference on Numerical Analysis and Applications (L. Vulkov, J. Wasniewsky and P. Yalamov, editors), Lecture Notes in Computer Science, 1988, 644–649, Springer, Berlin (2001).

179. “Newton’s Iteration for the Inversion of Structured Matrices” (by V. Y. Pan and Y. Rami), in ”Structured Matrices: Recent Developments in Theory and Computation”, 79–90 (edited by D. Bini, E. Tyrtyshnikov and P. Yalamov), Nova Science Publishers, USA (2001).

180. “Certification of Numerical Computation of the Sign of the Determinant of a Matrix” (by V. Y. Pan and Y. Yu), Algorithmica, 30, 708–724 (2001).

181. “Parallel Matrix Multiplication on a Linear Array with a Reconfigurable Pipelined Bus System” (by K. Li and V. Y. Pan), IEEE Transactions on Computing, 50, 5, 519–525 (2001).

182. “Numerical Computation of a Polynomial GCD and Extensions”, Information and Computation, 167, 2, 71–85 (2001).

183. “Univariate Polynomials: Nearly Optimal Algorithms for Factorization and Rootfinding”, Proc. Intern. Symp. on Symbolic Algebraic Comp. (ISSAC’01), 253–267, ACM Press, NY (2001).

184. “Nearly Optimal Algorithms for Univariate Polynomial Factorization and Rootfinding II: Computing a Basic Annulus for Splitting”, Trudy of the Steklov Math. Institute of the Russian Academy of Science (in English), volume 235, pp. 211–223, Moscow (2001).

185. “Asymptotic Acceleration of the Solution of Multivariate Polynomial Systems of Equations” (by B. Mourrain, V. Y. Pan and O. Ruatta), Proceedings of the Smalefest 2000 (F. Cucker and M. Rojas, editors), Foundations of Computational Math. Series, 267–294, World Scientific, New Jersey (2002).

186. “Nearly Optimal Algorithms for Numerical Univariate Polynomial Factorization and Rootfinding I: Splitting a Polynomial into Factors over an Annulus”, Proceedings of the Smalefest 2000 (F. Cucker and M. Rojas, editors), Foundations of Computational Math. Series, 325–353, World Scientific, New Jersey (2002).

187. “Structured Matrices and Newton’s Iteration: Unified Approach” (by V. Y. Pan, Y. Rami and X. Wang), Linear Algebra and Its Applications, 343/344, 233–265 (2002).

188. “Randomized Acceleration of Fundamental Matrix Computations”, Proc. of Symposium on Theoretical Aspects of Computer Science (STACS ’02), Lecture Notes in Computer Science, 2285, 215–226, Springer, Berlin (2002).

189. “Symbolic and Numerical Methods for Exploiting Structure in Constructing Resultant Matrices” (by I. Z. Emiris and V. Y. Pan), Journal of Symbolic Computation, 33, 393–413 (2002).

190. “Acceleration of Euclidean Algorithm and Extensions” (by V. Y. Pan and X. Wang), Proc. International Symp. on Symbolic and Algebraic Computation (ISSAC ’02), 207–213, ACM Press, New York (2002).

191. “Univariate Polynomials: Nearly Optimal Algorithms for Numerical Factorization and Root–Finding”, J. of Symbolic Computation, 33, 5, 701–733 (2002).

192. “Can We Optimize Toeplitz/Hankel Computations?” in Proc. the 5th International Workshop on Computer Algebra in Scientific Computing (CASC’02), (edited by E. W. Mayr, V. G. Ganzha, and E. V. Vorozhtzov), 253–264, Technische University of München, Germany (2002).

193. “Accelerated Solution of Multivariate Polynomial Systems of Equations” (by B. Mourrain, V. Y. Pan and O. Ruatta), SIAM J. on Computing, 32, 2, 435–454 (2003).

194. “Inversion of Displacement Operators” (by V. Y. Pan and X. Wang), SIAM J. on Matrix Analysis and Applications, 24, 3, 660–677 (2003).

195. “Matrix Structure and Loss-Resilient Encoding/Decoding”, Computers and Mathematics (with Applications), 46, 493–499 (2003).

196. “Acceleration of Euclidean Algorithm and Rational Number Reconstruction” (by X. Wang and V. Y. Pan), SIAM J. of Computing, 32, 2, 548–556 (2003).

197. “Improved Computation of Determinants and Resultants” (by I. Z. Emiris and V. Y. Pan), Proc. of the 6th Intern. Workshop on Computer Algebra in Scientific Computing

(CASC '03), (edited by E.W. Mayr, V.G. Ganzha, and E.V. Vorozhtzov), 81–94, Technische University of München (2003).

198. "Inverse Power and Durand-Kerner Iteration for Univariate Polynomial Root–Finding" (by D. A. Bini, L. Gemignani and V. Y. Pan), Computers and Mathematics (with Applications), 47, 2/3, 447–459 (2004).

199. "On Rational Number Reconstruction and Approximation" (by V. Y. Pan and X. Wang), SIAM J. on Computing, 33, 2, 502–503 (2004).

200. "Iterative Inversion of Structured Matrices" (by V. Y. Pan, M. Van Barel, X. Wang and G. Codevico), Theoretical Computer Science, 315, 2–3, 581–592 (2004).

201. "The Least-Squares Compression Policy for Newton–like Iteration for Structured Matrices" (by G. Codevico, V. Y. Pan, M. Van Barel, X. Wang, and A.–L. Zheng) in Proceedings of the 6th International Mathematica Symposium (IMS 2004), (edited by C. Jacob and P. Mitic), Banff, Alberta, Canada (August 2004).

202. "Improved Initialization of the Accelerated and Robust QR–like Polynomial Root–finding" (by D. A. Bini, L. Gemignani, and V. Y. Pan), Electronic Transactions on Numerical Analysis, 17, 195–205 (2004). (Proc. version in Proceedings of the 7th International Workshop on Computer Algebra in Scientific Computing (CASC'04), St. Petersburg, Russia (2004), (edited by E. W. Mayr, V. G. Ganzha, and E. V. Vorozhtzov), 39-50, Technische Univ. Mnchen, Germany (2004).)

203. "An Efficient Solution for Cauchy–like Systems of Linear Equations" (by Z. Chen and V. Y. Pan), Computers and Mathematics with Applications, 48, 529–537 (2004).

204. "Newton–like Iteration Based on Cubic Polynomials for Structured Matrices" (by G. Codevico, V. Y. Pan, and M. Van Barel), Numerical Algorithms, 36, 365–380 (2004).

205. "On Theoretical and Practical Acceleration of Randomized Computation of the Determinant of an Integer Matrix", Zapiski Nauchnykh Seminarov POMI (in English), Vol. 316, 163–187, St. Petersburg, Russia (2004).

206. "Can the TPR1 Structure Help Us to Solve the Algebraic Eigenproblem?", in Proc. of the 16th Ann. ACM-SIAM Symposium on Discrete Algorithms (SODA'05), 1069–1078, ACM Press, New York, and SIAM Publications, Philadelphia (2005).

207. "Fast and Stable QR Eigenvalue Algorithms for Generalized Semiseparable Matrices and Secular Equation" (by D. A. Bini, L. Gemignani and V. Y. Pan), Numerische Mathematik, 3, 373–408 (2005).

208. "Improved Algorithms for Computing Determinants and Resultants" (by I. Z. Emiris and V. Y. Pan), J. of Complexity, 21, 1, 43–71 (2005).

209. "Coefficient–free Adaptation of Polynomial Root–finders", Computers and Mathematics with Applications, 50, 263–269 (2005).

210. "Amended DSeSC Power Method for Polynomial Root–finding", Computers and Mathematics with Applications, 49, 9–10, 1515–1524 (2005).

211. "Homotopic Residual Correction Algorithms for General and Structures Matrices" (by V. Y. Pan, M. Kunin, R. Rosholt, and H. Kodal), Math. of Computation, 75, 345–368 (2006).

212. "Linking the TPR1, DPR1 and Arrow-head Matrix Structures" (by V. Y. Pan, B. Murphy, R. E. Rosholt, Y. Tang, X. Yan, and W. Cao), Computers and Mathematics with Applications, 52, 10-11, 1603–1608 (2006).

213. "Real Root–finding" (by V. Y. Pan, G. Qian, B. Murphy, R. E. Rosholt, and Y. Tang), Proceedings of the Third International Workshop on Symbolic–Numeric Computation (SNC 2007), July 2007, London, Ontario, Canada (Jan Verschelde and Stephen Watt, editors), 161–169, ACM Press, New York (2007).

214. “Null Space and Eigenspace Computation with Additive Preconditioning” (by V. Y. Pan and X. Yan), Proceedings of the Third International Workshop on Symbolic–Numeric Computation (SNC’2007), July 2007, London, Ontario, Canada (Jan Verschelde and Stephen Watt, editors), 170–179, ACM Press, New York (2007).

215. “The Schur Aggregation for Solving Linear Systems of Equations” (by V. Y. Pan, B. Murphy, R. E. Rosholt, and M. Tabanjeh), Proceedings of the Third International Workshop on Symbolic–Numeric Computation (SNC’2007), July 2007, London, Ontario, Canada (Jan Verschelde and Stephen Watt, editors), 180–188, ACM Press, New York (2007).

216. “New Homotopic/Factorization and Symmetrization Techniques for Newton’s and Newton’s Structured Iteration”, Computers Math. with Applications, 54, 721–729 (2007).

217. “Additive Preconditioning and Aggregation in Matrix Computations” (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, I. Taj–Eddin, Y. Tang, and X. Yan), Computers and Mathematics with Applications, 55, 8, 1870–1886 (2008).

218. “Eigen-solving via Reduction to DPR1 Matrices” (by V. Y. Pan, B. Murphy, R. Rosholt, Y. Tang, X. Wang, and A. Zheng), Computers and Mathematics with Applications, 56, 166–171 (2008).

219. “Additive Preconditioning for Matrix Computations” (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, Y. Tang, and X. Yan), in Proc. of the Third International Computer Science Symposium in Russia (CSR’2008), Lecture Notes in Computer Science (LNCS), 5010, 372–383 (2008).

220. “Degeneration of Integer Matrices Modulo an Integer” (by V. Y. Pan and X. Wang), Linear Algebra and Its Applications, 429, 2113–2130 (2008).

221. “Schur Aggregation for Linear Systems and Determinants” (by V. Y. Pan, D. Grady, B. Murphy, G. Qian, R. E. Rosholt, and A. Ruslanov), Theoretical Computer Science, Special Issue on Symbolic-Numerical Algorithms (D.A. Bini, V. Y. Pan, and J. Verschelde, editors), 409, pp. 255–268 (2008).

222. “Fast Rectangular Matrix Multiplication and Some Applications” (by S. Ke, B. Zeng, W. Han, V. Y. Pan), Science in China, Series A: Mathematics, 51, 3, 389–406, 2008.

223. “Additive Preconditioning, Eigenspaces, and the Inverse Iteration” (by V. Y. Pan and X. Yan), Linear Algebra and Its Applications, 430, 186–203 (2009).

224. “A New Error–free Floating-Point Summation Algorithm” (by V. Y. Pan, B. Murphy, G. Qian, and R. E. Rosholt), Computers and Mathematics with Applications, 57, 560–564 (2009).

225. “Preconditioning, Randomization, Solving Linear Systems, Eigen-Solving, and Root–Finding” (by V. Y. Pan, G. Qian, and A.–L. Zheng), Proc. International Symposium on Symbolic- Numerical Computations (SNC’2009), Kyoto, Japan, August 2009, (edited by Hiroshi Kai and Hiroshi Sekigawa), pp. 5–6, ACM Press, New York(2009).

226. “Nearly Optimal Symbolic-Numerical Algorithms for Structured Integer Matrices and Polynomials” (by V. Y. Pan, B. Murphy, and R. E. Rosholt), Proc. Intern. Symp. Symbolic-Numerical Comp. (SNC’2009), Kyoto, Japan, August 2009, (edited by Hiroshi Kai and Hiroshi Sekigawa), 105–113, ACM Press, New York (2009).

227. “Root Squaring with DPR1 Matrices”, in Zapiski Nauchnykh Seminarov POMI (in English), volume 373 (edited by N. N. Vasiliev and A. M. Vershik), pp. 189–193 (2009).

228. “Solving Homogeneous Linear Systems with Randomized Preprocessing” (by V. Y. Pan and G. Qian), Linear Algebra and Its Applications, 432, 3272–3318 (2010).

229. “Unified Nearly Optimal Algorithms for Structured Matrices” (by V. Y. Pan, B. Murphy, and R. E. Rosholt), Operator Theory: Advances and Applications, 199, 359–375, Birkhaüser, Basel (2010).

230. “Additive Preconditioning for Matrix Computations” (by V. Y. Pan, D. Ivolgin, B. Murphy, R. E. Rosholt, Y. Tang, and X. Yan), Linear Algebra and Its Applications, 432, 1070–1089 (2010).

231. “Newton’s Iteration for Matrix Inversion, Advances and Extensions”, pp. 364–381, in MATRIX METHODS: THEORY, ALGORITHMS AND APPLICATIONS (dedicated to the Memory of Gene Golub, edited by Vadim Olshevsky and Eugene Tyrtyshnikov), World Scientific Publishing, New Jersey, ISBN-13 978-981-283-601-4, ISBN-10-981-283-601-2 (2010).

232. “Advancing Matrix Computations with Randomized Preprocessing” (by V. Y. Pan, G. Qian, and A.–L. Zheng), in Proc. of the Fifth International Computer Science Symposium in Russia (CSR’2010), Kazan, Russia, June 2010 (Farid Ablaev and Ernst W. Mayr, editors), Lecture Notes in Computer Science (LNCS), pages 303–314, Springer, Berlin (2010).

233. “Real and Complex Polynomial Root–Finding with Eigen–Solving and Preprocessing” (by V. Y. Pan and A.–L. Zheng), (edited by Stephen Watt), in Proc. International Symp. on Symbolic and Algebraic Computation (ISSAC’2010), pages 219–226, ACM Press, New York (July 2010).

234. “Matrix Computations and Polynomial Root–finding with Preprocessing” (by V. Y. Pan, G. Qian, A.–L. Zheng, and Z. Chen), Linear Algebra and Its Applications, 434, 854–879 (2011).

235. “New Progress in Real and Complex Polynomial Root–Finding” (by V. Y. Pan and A.–L. Zheng), Computers and Math. (with Applications), 61, 1305–1334 (2011).

236. “Univariate Polynomial Root–Finding by Arming with Constraints”, in Proc. International Symposium on Symbolic-Numerical Computations (SNC’2011), San Jose, California, 2011 (edited by Marc Moreno Masa), 112–121, ACM Press, New York (2011).

237. “Randomized Preconditioning of the MBA Algorithm” (by V. Y. Pan, G. Qian, and A.–L. Zheng), in Proc. International Symp. on Symbolic and Algebraic Computation (ISSAC’2011), San Jose, California, June 2011 (edited by Anton Leykin), 281–288, ACM Press, New York (2011).

238. “Nearly Optimal Solution of Rational Linear Systems of Equations with Symbolic Lifting and Numerical Initialization”, Computers and Mathematics with Applications, 62, 1685–1706 (2011).

239. “Root–finding by Expansion with Independent Constraints” (by V. Y. Pan and A.–L. Zheng), Computers and Mathematics with Applications, 62, 3164–3182 (2011).

240. “A Note on the Paper by Murat Cenk and Ferruh Ozbudak “Multiplication of Polynomials Modulo x^n”, Theoret. Comput. Sci. 412 (2011) 3451–3462”, Theoret. Comput. Sci. 428, page 91 (2012).

241. “Efficient Polynomial Root–refiners: A Survey and New Record Efficiency Estimate” (by J. M. McNamee and V. Y. Pan), Computers and Mathematics with Applications, 63, 239–254 (2012).

242. “Root–refining for a Polynomial Equation”, Proceedings of the 14th International Workshop on Computer Algebra in Scientific Computing (CASC’2012), (V. P. Gerdt, V. Koepf, E. W. Mayr, and E. V. Vorozhtsov, editors), Lecture Notes in Computer Science, 7442, 271–282, Springer, Heidelberg (2012).

243. “Real and Complex Polynomial Root–finding via Eigen–solving and Randomization” (by V. Y. Pan, G. Qian, and A.–L. Zheng), Proceedings of the 14th International Workshop on Computer Algebra in Scientific Computing (CASC’2012), (V. P. Gerdt, V.

Koepf, E. W. Mayr, and E. V. Vorozhtsov, editors), Lecture Notes in Computer Science, 7442, 283–293, Springer, Heidelberg (2012).

244. "Solving Linear Systems of Equations with Randomization, Augmentation and Aggregation" (by V. Y. Pan and G. Qian), Linear Algebra and Its Applications", 437, 2851–2876 (2012).

245. "Randomized Preconditioning versus Pivoting" (by V. Y. Pan, G. Qian, and A.–L. Zheng), Linear Algebra and Its Applications, 438, 4, 1883–1889 (2013).

246. "On the Boolean Complexity of the Real Root Refinement" (by V. Y. Pan and E. P. Tsigaridas), in Proc. International Symp. on Symbolic and Algebraic Computations (ISSAC'2013), Boston, Massachusetts, June 2013 (M. Kauers, editor), 299–306, ACM Press, New York (2013).

247. "Polynomial Evaluation and Interpolation and Transformations of Matrix Structures", Proceedings of the 15th International Workshop on Computer Algebra in Scientific Computing (CASC'2013), (V. P. Gerdt, V. Koepf, E. W. Mayr, and E. V. Vorozhtsov, editors), Lecture Notes in Computer Science, 8136, 273–287, Springer, Heidelberg (2013).

248. "Fast Approximate Computations with Cauchy Matrices, Polynomials and Rational Functions", Proc. of the Ninth International Computer Science Symposium in Russia (CSR'2014), (E. A. Hirsch et al., editors), Moscow, Russia, June 2014, Lecture Notes in Computer Science (LNCS), 8476, pp. 287–300, Springer International Publishing, Switzerland (2014).

249. "Nearly Optimal Computations with Structured Matrices" by Victor Y. Pan and Elias Tsigaridas, Proc. of the International Conference on Symbolic–Numeric Computation (SNC 2014), (edited by S. Watt and J. Verschelde), 21–30, ACM Press, New York, 2014.

Also April 18, 2014, arXiv:1404.4768 [math.NA] and http://hal.inria.fr/hal-00980591

250. "Accelerated Approximation of the Complex Roots of a Univariate Polynomial" by Victor Y. Pan and Elias Tsigaridas, Proc. of the International Conference on Symbolic Numeric Computation (SNC 2014), (edited by S. Watt and J. Verschelde), pages 132–134, ACM Press, New York, 2014.

251. "Global Newton Iteration over Archimedean and non-Archimedean Fields" by Jonathan D. Hauenstein, Victor Pan, Agnes Szanto, Proceedings of the 16th International Workshop on Computer Algebra in Scientific Computing (CASC'2014), (V.P. Gerdt, V. Koepf, W.M. Zeiler, and E.V. Vorozhtsov, editors), Lecture Notes in Computer Science, 8660, 202–217, Springer, Cham (2014). Also April 17, 2014, arXiv:1404.5525 [math.NA]

252. "Real Polynomial Root–finding by Means of Matrix and Polynomial Iterations", by V. Y. Pan, Proceedings of the 16th International Workshop on Computer Algebra in Scientific Computing (CASC'2014), (V.P. Gerdt, V. Koepf, W.M. Zeiler, and E.V. Vorozhtsov, editors), Lecture Notes in Computer Science, 8660, 335–349, Springer, Cham (2014). Also Tech. Report TR 20140011, *PhD Program in Comp. Sci.*, *Graduate Center, CUNY*, 2014. Available at http://www.cs.gc.cuny.edu/tr/techreport.php?id=476

253. "Transformations of Matrix Structures Work Again", Linear Algebra and Its Applications, 465, 1-32 (2015).

254. "Estimating the Norms of Circulant and Toeplitz Random Matrices and Their Inverses" (by V. Y. Pan, J. Svadlenka, and L. Zhao), Linear Algebra and Its Applications, 468, 197–210 (2015)

255. "Nearly Optimal Refinement of Real Roots of a Univariate Polynomial" by V. Y. Pan and E. P. Tsigaridas, J. of Symbolic Computation, 74, 181–204 (2016)

256. "Random Multipliers Numerically Stabilize Gaussian and Block Gaussian Elimination: Proofs and an Extension to Low-rank Approximation" (by V. Y. Pan, G. Qian, and

X. Yan), Linear Algebra and Its Applications, 481, 202–234 (2015).

257. "Real Root Isolation by Means of Root Radii Approximation" (by V. Y. Pan and L. Zhao), Proceedings of the 17th International Workshop on Computer Algebra in Scientific Computing (CASC'2015), (V. P. Gerdt, V. Koepf, and E. V. Vorozhtsov, editors), Lecture Notes in Computer Science, 9301, 347–358, Springer, Heidelberg (2015), (also in arXiv:1501.05386 [math.NA] (36 pages, 12 tables), 22 January 2015, revised October 21, 2015.).

258. " Randomized Circulant and Gaussian Preprocessing" (by V. Y. Pan and L. Zhao), Proceedings of the 17th International Workshop on Computer Algebra in Scientific Computing (CASC'2015), (V. P. Gerdt, V. Koepf, and E. V. Vorozhtsov, editors), Lecture Notes in Computer Science, 9301, 359–373, Springer, Heidelberg (2015).

259. "Real Polynomial Root–finding by Means of Matrix and Polynomial Iterations" by V. Y. Pan and L. Zhao, Theoretical Computer Science, Special Issue on Symbolic–Numerical Algorithms (Stephen Watt, Jan Verschelde, and Lihong Zhi, editors), in print.

260. "Accelerated Approximation of the Complex Roots and Factors of a Univariate Polynomial" by V. Y. Pan and E. P. Tsigaridas, Theoretical Computer Science, Special Issue on Symbolic–Numerical Algorithms (Stephen Watt, Jan Verschelde, and Lihong Zhi, editors), in print.

261. "Nearly Optimal Computations with Structured Matrices" by V. Y. Pan and E. P. Tsigaridas, Theoretical Computer Science, Special Issue on Symbolic–Numerical Algorithms (Stephen Watt, Jan Verschelde, and Lihong Zhi, editors), in print.

262. "How Bad Are Vandermonde Matrices?", SIAM Journal of Matrix Analysis, 37 (2016), no. 2, 676–694.

263. "Low-rank Approximation of a Matrix: Novel Insights, New Progress, and Extensions" by Victor Y. Pan and Liang Zhao, Proc. of the Eleventh International Computer Science Symposium in Russia (CSR'2016), (Alexander Kulikov and Gerhard Woeginger, editors), St. Petersburg, Russia, June 2016, Lecture Notes in Computer Science (LNCS), Volume 9691, 352–366, Springer International Publishing, Switzerland (2016).

264. "Simple and Nearly Optimal Polynomial Root–Finding by Means of Root Radii Approximation", ACA 2015 Springer PROMS book of proceedings, in print.

265. "Fast approximate computations with Cauchy matrices and polynomials", Math. of Computation, in print.

266. "New Studies of Randomized Augmentation and Additive Preprocessing" (by Victor Y. Pan and Liang Zhao), Linear Algebra Appl. (2017).

Available at http://dx.doi.org/10.1016/j.laa.2016.09.035 and arxiv 1412.5864 math.NA (38 pages), December 18, 2014, revised on July 10, 2015.

2.7 GOOGLE SCHOLAR LIST: 81 MOST CITED PUBLICATIONS. 2/2017

1. Polynomial and matrix computations. Fundamental Algorithms, vol. 1, D Bini, V.Y. Pan, Birkhäuser, Boston, Springer Science and Business Media, 614 citations, 1994.

2. Algorithms and theory of computation handbook, volume 2: special topics and techniques, MJ Atallah, M Blanton, Chapman and Hall/CRC, 409 citations, 2009.

3. Solving a polynomial equation: some history and recent progress, V.Y. Pan, SIAM review 39 (2), 187-220, 338, 1997

4. Structured matrices and polynomials: unified superfast algorithms, V.Y. Pan, Birkhäuser, Boston/ Springer, NY, Springer Science and Business Media, 327, 2012

5. Fast rectangular matrix multiplication and applications, X. Huang, V.Y. Pan, Journal of complexity 14 (2), 257-299, 183, 1998

6. Univariate polynomials: nearly optimal algorithms for factorization and rootfinding, V.Y. Pan, Proceedings of the 2001 international symposium on Symbolic and algebraic computs., 175, 2001

7. Efficient parallel solution of linear systems, V.Y. Pan, J. Reif, Proceedings of the seventeenth annual ACM symposium on Theory of computing, 171, 1985

8. How to multiply matrices faster, V.Y. Pan, Springer-Verlag, New York, Inc. 170, 1984

9. On computations with dense structured matrices, V.Y. Pan, Mathematics of Computation 55 (191), 179-190, 150, 1990

10. An improved Newton iteration for the generalized inverse of a matrix, with applications, V.Y. Pan, R. Schreiber, SIAM Journal on Scientific and Statistical Computing 12 (5), 1109-1130, 147, 1991

11. Multivariate polynomials, duality, and structured matrices, B. Mourrain, V.Y. Pan, Journal of Complexity 16 (1), 110-180, 144, 2000

12. How can we speed up matrix multiplication? V.Y. Pan, SIAM review 26 (3), 393-415, 143, 1984

13. Optimal and nearly optimal algorithms for approximating polynomial zeros, V.Y. Pan, Computers and Mathematics with Applications 31 (12), 97-138, 141, 1996

14. Numerical methods for roots of polynomials J.M. McNamee, V.Y. Pan, Newnes, 139, 2013

15. Fast and efficient parallel solution of dense linear systems, V.Y. Pan, J. Reif, Computers and Mathematics with Applications 17 (11), 1481-1491, 135*, 1989

16. Methods of computing values of polynomials, V.Y. Pan, Russian Mathematical Surveys 21 (1), 105-136, 122, 1966

17. Complexity of parallel matrix computations, V.Y. Pan, Theoretical Computer Science 54 (1), 65-85, 117, 1987

18. Strassen's algorithm is not optimal; trilinear technique of aggregating, uniting and canceling for constructing fast algorithms for matrix operations, V.Y. Pan, 19th Annual Symposium on Foundations of Computer Science, 166-176, 115, 1978

19. The complexity of the matrix eigenproblem, V.Y. Pan, Z.Q. Chen, Proceedings of the thirty-first annual ACM symposium on Theory of computing ..., 107, 1999

20. Fast and stable QR eigenvalue algorithms for generalized companion matrices and secular equations, D.A. Bini, L Gemignani, V.Y. Pan, Numerische Mathematik 100 (3), 373-408

21. Complexity of computations with matrices and polynomials, V.Y. Pan, SIAM Review 34 (2), 225-262, 98, 1992

22. Processor efficient parallel solution of linear systems over an abstract field, E. Kaltofen, V.Y. Pan, Proceedings of the third annual ACM symposium on Parallel algorithms and ..., 98, 1991

23. Efficient parallel algorithms for computing all pair shortest paths in directed graphs, Y. Han, V. Pan, J. Reif, Proceedings of the fourth annual ACM symposium on Parallel algorithms and ..., 95*, 1992

24. Computer science handbook, A.B. Tucker, CRC press, 93, 2004

25. Computation of approximate polynomial GCDs and an extension, V.Y. Pan, Information and computation, 167 (2), 71-85, 82, 2001

26. Optimal (up to polylog factors) sequential and parallel algorithms for approximating complex polynomial zeros, V.Y. Pan, Proceedings of the twenty-seventh annual ACM symposium on Theory of ..., 79, 1995

27. Computing exact geometric predicates using modular arithmetic with single precision, H. Brönnimann, I.Z. Emiris, V.Y. Pan, S. Pion, Proceedings of the thirteenth annual symposium on Computational geometry ..., 77, 1997

28. On practical algorithms for accelerated matrix multiplication, J. Laderman, V.Y. Pan, X.-H. Sha, Linear Algebra and Its Applications 162, 557-588, 75, 1992

29. Methods of aggregation, W.L. Miranker, V.Y. Pan, Linear Algebra and Its Applications, 29, 231-257, 75, 1980

30. Parametrization of Newton's iteration for computations with structured matrices and applications, V.Y. Pan, Computers and Mathematics with Applications, 24, (3), 61-75, 69, 1992

31. Polynomial division and its computational complexity, D. Bini, V.Y. Pan, Journal of Complexity 2 (3), 179-203, 68, 1986

32. Sequential and parallel complexity of approximate evaluation of polynomial zeros, V.Y. Pan, Computers and Mathematics with Applications 14 (8), 591-622, 65, 1987

33. Sign determination in residue number systems, H. Brönnimann, I.Z, Emiris, V.Y. Pan, S. Pion, Theoretical Computer Science 210 (1), 173-197, 61, 1999

34. Symbolic and numeric methods for exploiting structure in constructing resultant matrices I.Z. Emiris, V,Y. Pan, Journal of Symbolic Computation 33 (4), 393-413, 60, 2002

35. New fast algorithms for matrix operations, V.Y. Pan, SIAM Journal on Computing 9 (2), 321-342, 60, 1980

36. Fast and efficient solution of path algebra problems, V.Y. Pan, J. Reif, Journal of Computer and System Sciences 38 (3), 494-510, 58, 1989

37. Processor-efficient parallel solution of linear systems. II. The positive characteristic and singular cases, E. Kaltofen, V.Y. Pan, Foundations of Computer Science, 1992. Proceedings., 33rd Annual Symposium ..., 57, 1992

38. Structured matrices and Newton's iteration: unified approach, V.Y. Pan, Y. Rami, X. Wang, Linear algebra and its applications 343, 233-265, 55, 2002

39. Inverse power and Durand-Kerner iterations for univariate polynomial root-finding, D.A. Bini, L. Gemignani, V.Y. Pan, Computers and Mathematics with Applications 47 (2), 447-459, 54, 2004

40. Acceleration of Euclidean algorithm and rational number reconstruction, X. Wang, V.Y. Pan, SIAM Journal on Computing 32 (2), 548-556, 53, 2003

41. Fast and efficient parallel algorithms for the exact inversion of integer matrices, V.Y. Pan, International Conference on Foundations of Software Technology and ... , 52, 1985

42. Approximating complex polynomial zeros: modified Weyl's quadtree construction and improved Newton's iteration, V.Y. Pan, Journal of Complexity 16 (1), 213-264, 51, 2000

43. Additive preconditioning, eigenspaces, and the inverse iteration, V.Y. Pan, X. Yan, Linear Algebra and Its Applications 430 (1), 186-203, 48, 2009

44. Improved algorithms for computing determinants and resultants, I.Z. Emiris, V.Y. Pan, Journal of Complexity 21 (1), 43-71, 47, 2005

45. Improved initialization of the accelerated and robust QR-like polynomial root-finding, D.A. Bini, L. Gemignani, V.Y. Pan, Electronic Transactions on Numerical Analysis 17, 195-205, 47, 2004

46. A unified superfast algorithm for boundary rational tangential interpolation problems and for inversion and factorization of dense structured matrices, V. Olshevsky, V.Y. Pan, Foundations of Computer Science, 1998, Proceedings of 39th Annual Symposium on ..., 47, 1998

47. Asymptotic acceleration of solving multivariate polynomial systems of equations, B. Mourrain, V.Y. Pan, Proceedings of the thirtieth annual ACM symposium on Theory of computing ..., 47, 1998

48. Computing the determinant and the characteristic polynomial of a matrix via solving linear systems of equations, V.Y. Pan, Information Processing Letters 28 (2), 71-75, 47, 1988

49. The structure of sparse resultant matrices, I.Z. Emiris, V.Y. Pan, Proceedings of the 1997 international symposium on Symbolic and algebraic ..., 46, 1997

50. Decreasing the displacement rank of a matrix, V.Y. Pan, SIAM Journal on Matrix Analysis and Applications 14 (1), 118-121, 46, 1993

51. Parallel solution of Toeplitzlike linear systems, V.Y. Pan, Journal of Complexity 8 (1), 1-21, 46, 1992

52. Schur aggregation for linear systems and determinants, V.Y. Pan, D. Grady, B. Murphy, G. Qian, R.E. Rosholt, D. Ruslanov, Theoretical Computer Science, 409 (2), 255-268, 45, 2008

53. Randomized preprocessing versus pivoting, V.Y. Pan, G. Qian, A.-L. Zheng, Linear Algebra and Its Applications, 438 (4), 1883-1899, 44, 2013

54. Solving special polynomial systems by using structured matrices and algebraic residues, B. Mourrain, V.Y. Pan, Foundations of Computational Mathematics, 287-304, 44, 1997

55. Parallel complexity of tridiagonal symmetric eigenvalue problem, DBV Pant Discrete Algorithms, 384, 44, 1991

56. Parallel matrix multiplication on a linear array with a reconfigurable pipelined bus system, K. Li, V.Y. Pan, IEEE Transactions on Computers 50 (5), 519-525, 43, 2001

57. Parallel evaluation of the determinant and of the inverse of a matrix, Z. Galil, V.Y. Pan, Information Processing Letters, 30 (1), 41-45, 43, 1989

58. Field extension and trilinear aggregating, uniting and canceling for the acceleration of matrix multiplications, V.Y. Pan, Foundations of Computer Science, 1979., 20th Annual Symposium on, 28-38, 43, 1979

59. On schemes for the evaluation of products and inverses of matrices, V,.Y. Pan, Uspekhi Matematicheskikh Nauk 27 (5), 167, 43, 1972

60. Certification of numerical computation of the sign of the determinant of a matrix, V.Y. Pan, Y. Yu, Algorithmica 30 (4), 708-724, 42, 2001

61. Computing matrix eigenvalues and polynomial zeros where the output is real, D. Bini, V.Y. Pan, SIAM Journal on Computing 27 (4), 1099-1115, 42, 1998

62. Inversion of displacement operators V/Y. Pan, X. Wang, SIAM Journal on Matrix Analysis and Applications 24 (3), 660-677, 41, 2003

63. Concurrent iterative algorithm for Toeplitz-like linear systems, V.Y. Pan, IEEE Transactions on Parallel and Distributed Systems 4 (5), 592-600, 41, 1993

64. New combinations of methods for the acceleration of matrix multiplications, V.Y. Pan, Computers and Mathematics with Applications 7 (1), 73-125, 41, 1981

65. A new approach to fast polynomial interpolation and multipoint evaluation, V.Y. Pan, A. Sadikou, E. Landowne, O. Tiga, Computers and Mathematics with Applications 25 (9), 25-30 40, 1993

66. Nearly optimal computations with structured matrices, V.Y. Pan, E.P. Tsigaridas, Proceedings of the 2014 Symposium on Symbolic-Numeric Computation, 21-30, 39, 2014

67. New progress in real and complex polynomial root-finding, V.Y. Pan, A.-L. Zheng, Computers and Mathematics with Applications 61 (5), 1305-1334, 39, 2011

68. Randomized preprocessing of homogeneous linear systems of equations, V.Y. Pan, G. Qian, Linear Algebra and Its Applications 432 (12), 3272-3318, 39, 2010

69. Matrix computations and polynomial root-finding with preprocessing, V.Y. Pan, G. Qian, A.L. Zheng, and Z. Chen, Linear Algebra and Its Applications 434 (4), 854-879, 38, 2011

70. Newton's iteration for structured matrices, V.Y. Pan, S. Branham, R.E. Rosholt, A.-L. Zheng, Fast reliable algorithms for matrices with structure, 189-210, 37, 1999

71. Acceleration of Euclidean algorithm and extensions, V.Y. Pan, X. Wang, Proceedings of the 2002 international symposium on Symbolic and algebraic ..., 36, 2002

72. Additive preconditioning for matrix computations V.Y. Pan, D. Ivolgin, B. Murphy, R.E. Rosholt, Y. Tang, X. Yan, Linear Algebra and Its Applications, 432 (4), 1070-1089, 34, 2010

73. Additive preconditioning and aggregation in matrix computations, V.Y. Pan, D. Ivolgin, B. Murphy, R.E. Rosholt, I. Taj-Eddin, Y. Tang, X. Yan, Computers and Mathematics with Applications 55 (8), 1870-1886, 34, 2008

74. Homotopic residual correction processes, V.Y. Pan, M. Kunin, R. Rosholt, H. Kodal, Mathematics of Computation 75 (253), 345-368, 33, 2006

75. Superfast algorithms for Cauchy-like matrix computations and extensions, V.Y. Pan, A.-L. Zheng, Linear algebra and its applications 310 (1-3), 83-108, 33, 2000

76. Controlled iterative methods for solving polynomial systems, D. Bondyfalat, B. Mourrain, V.Y. Pan, Proceedings of the 1998 international symposium on Symbolic and algebraic ..., 33, 1998

77. Graeffe's, Chebyshev-like, and Cardinal's Processes for Splitting a Polynomial into Factors, D. Bini, V.Y. Pan, Journal of Complexity 12 (4), 492-511, 33, 1996

78. Improved parallel computations with Toeplitz-like and Hankel-like matrices, D. Bini, V.Y. Pan, Linear algebra and its applications 188, 3-29, 33, 1993

79. Parallel computation of polynomial GCD and some related parallel computations over abstract fields, V.Y. Pan, Theoretical Computer Science 162 (2), 173-223, 32, 1996

80. Fast multipoint polynomial evaluation and interpolation via computations with structured matrices, V.Y. Pan, A.-L. Zheng, X. Huang, Y. Yu, Annals of Numerical Mathematics 4, 483-510, 32, 1996

81. Transformations of matrix structures work again, V.Y. Pan, Linear Algebra and Its Applications 465, 107-138, 30, 2015

3 TALKS AND PRESENTATIONS SINCE 1991

1991

2nd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'91), San Francisco, California, January 1991. Refereed paper was accepted by Program Committee.

Fifth Biennial Copper Mountain Conference on Multigrid Methods, Copper Mountain, Colorado, April 1991. Refereed paper was accepted by Program Committee.

18th International Colloquium on Automata, Languages and Programming (ICALP'91), Madrid, Spain, July 1991. Refereed paper was accepted by Program Committee.

3rd Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA'91), Hilton Head, South Carolina, July 1991. Refereed paper was accepted by Program Committee.

4th SIAM Conference on Applied Linear Algebra, Minneapolis, Minnesota, September 1991. Two talks at mini-symposia.

3rd IEEE Symposium on Parallel and Distributed Algorithms, Dallas, Texas, December 1991. Refereed paper was accepted by Program Committee.

1992

3rd Annual ACM-SIAM Symposium on Discrete Algorithms, Orlando, Florida, January 1992. Refereed paper was accepted by Program Committee.

Israel Symposium on the Theory of Computing and Systems (ISTCS'92), Haifa, Israel, May 1992. Refereed paper was accepted by Program Committee.

4th Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA'92), San Diego, California, June-July 1992. Two refereed papers were accepted by Program Committee.

33rd Annual IEEE Conference on Foundations of Computer Science (FOCS'92), Pittsburgh, Pennsylvania, October 1992. Three refereed papers were accepted by Program Committee.

Second Biennial Copper Mountain Conference on Iterative Methods, Copper Mountain, Colorado, April 1992. Refereed paper was accepted by Program Committee.

1993

Panamerican Workshop for Applied and Computational Mathematics, Caracas, Venezuela, January 1993. Three refereed papers were accepted by Program Committee.

Workshop on Applicable Algebra, Obervolfach, Germany, February 1992. Invited talk (30 minutes).

Annual ACM International Symposium on Symbolic and Algebraic Computations (ISSAC'93), Kiev, Ukraine, July 1993. Refereed paper was accepted by Program Committee.

3rd SIAM Conference on Linear Algebra, Seattle, Washington, August 1993. Invited talk at mini-symposium (30 minutes).

884th Meeting of the American Math. Society, Syracuse, New York, September 1993. Invited talk (30 minutes).

34th Annual IEEE Conference on Foundations of Computer Science, Palo Alto, California, November 1993. Refereed paper was accepted by Program Committee.

Workshop on Parallel Algorithms, DIMACS, Rutgers University, New Jersey, November 1993. Invited talk (30 minutes).

1994

5th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'94). Two refereed papers were accepted by Program Committee.

Third Biennial Colorado Conference on Iterative Methods (CCIM'94), Breckenridge, Colorado, April 1994. Refereed paper was accepted by Program Committee.

5th SIAM Conference on Applied Linear Algebra, Snowbird, Utah, June 1994. Three refereed papers were accepted by Program Committee.

First International Symposium on Parallel Algebraic and Symbolic Computation (PASCO'94), Linz, Austria, September 1994. Refereed paper was accepted by Program Committee.

35th Annual IEEE Conference on Foundation of Computer Science (FOCS'94), Santa Fe, New Mexico, November 1994. Refereed paper was accepted by Program Committee.

1995

Annual ACM Symposium on Theory of Computing (STOC'95), Las Vegas, Arizona, May 1995. Refereed paper was accepted by Program Committee.

25th AMS-SIAM Summer Seminar on Mathematics of Numerical Analysis, Park City, Utah, July-August 1995. Invited plenary talk (1 hour).

Seminar on Real Computation and Complexity, Schloss Dagstuhl, Germany, November 1995. Invited talk (45 minutes).

1996

7th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'96), Atlanta, Georgia, January 1996. Refereed paper was accepted by Program Committee.

Fourth Biennial Copper Mountain Conference on Iterative Methods, Copper Mountain, Colorado, April 1996. Refereed paper was accepted by Program Committee.

NATO Advanced Study Workshop on Algorithms for Sparse Large Scale Linear Systems, Las Palmas de Grand Canaria, Spain, June 1996. Invited Talk (1 hour).

Workshop on Symbolic - Numeric Algebra for Polynomials (SNAP'96), INRIA Sophia Antipolis, France, July 1996. Invited talk (45 minutes).

International Conference on Structured Matrices, Cortona, Italy, September 1996. Two refereed papers were accepted by Program Committee.

1997

International Conference on Foundation of Computational Mathematics (FoCM), Rio de Janeiro, Brazil, January 1997. Invited semi-plenary talk (50 minutes) and invited talk (30 minutes).

FRISCO Open Workshop 97, INRIA Sophia Antipoles, France, March 1997. Invited talk (20 minutes).

The 29th Annual ACM Symposium of Theory of Computing (STOC'97), El Paso, Texas, May 1997. Refereed paper was accepted by Program Committee.

The 13th Annual ACM Symposium on Computational Geometry, Nice, France, June 1997. Refereed paper was accepted by Program Committee.

Faddeev Memorial International Algebraic Conference, St. Petersburg, Russia, June 1997. Invited talk (45 minutes).

Annual ACM International Symposium on Symbolic and Algebraic Computation (ISSAC'97), Maui, Hawaii, August 1997. Refereed paper was accepted by Program Committee.

Second ACM International Symposium on Parallel Symbolic Computation (PASCQ'97), Maui, Hawaii, August 1997. Refereed paper was accepted by Program Committee.

1998

9th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'98), January 1998, San Francisco, California. Refereed paper was accepted by Program Committee.

Fifth Biennial Copper Mountain Conference on Iterative Methods, March 1998. Copper Mountain, Colorado. Refereed paper was accepted by Program Committee.

933rd AMS Meeting, April 1998, Philadelphia. Invited talk at mini-symposium.

30th Annual ACM Symposium on Theory of Computing (STOC'98), May 1998, Dallas, Texas. Refereed paper was accepted by Program Committee.

Kurosh Memorial Algebraic Conference, June 1998, Moscow, Russia. Invited talk at mini-symposium.

International Seminar on Real Computation and Complexity, June 1998, Dagstuhl, Germany. Invited talk (45 minutes).

SIAM Annual Meeting, July 1998, Toronto, Canada. Invited talk at mini-symposium.

Annual International Conference IMACS on Application of Computer Algebra (ACA), August 1998, Praha, Czech Republic. Two invited talks at two mini-symposia.

Annual ACM International Symposium on Symbolic and Algebraic Computations (ISSAC'98), August 1998, Rostock, Germany. Refereed paper was accepted by Program Committee.

5th International Symposium on Solving Irregularly Structured Problems Parallel (IRREGULAR'98), August 1998, Berkeley, California. Refereed paper was accepted by Program Committee.

MSRI Workshop on Solving Systems of Equations, September 1998, Berkeley, California. Invited talk (30 minutes).

39th Annual IEEE Conference on Foundations of Computer Science (FOCS'98), October 1998, Palo Alto, California. Refereed paper was accepted by Program Committee.

1999

10th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'99), January 1999, Baltimore, Maryland. Refereed paper was accepted by Program Committee.

13th International Parallel Processing Symposium and 10th Symposium on Parallel and Distributed Computing (IPPS/SPDP'99), San Juan, Puerto Rico, April 1999. Refereed paper was accepted by Program Committee.

31st Annual ACM Symposium on Theory of Computing (STOC'99), May 1999, Atlanta, Georgia. Refereed paper was accepted by Program Committee.

2nd International Workshop on Computer Algebra in Scientific Computing (CASC'99), June 1999, Munich, Germany. Invited lecture (45 minutes).

Annual International Conference IMACS on Application of Computer Algebra (ACA), June 1999, El Escorial, Madrid, Spain. Two invited lectures at two mini-symposia.

1999 AMS-IMS-SIAM Summer Research Conference on Structured Matrices in Operator Theory, Numerical Analysis, Control, Signal and Image Processing, June-July 1999, Boulder, Colorado. Invited lecture (45 minutes).

Annual Intern. Colloquium of Automata, Languages, and Programming (ICALP'99), July 1999, Praha, Czech Republic. Refereed paper was accepted by Program Committee.

International Symposium on Foundations of Computational Mathematics (FoCM'99), July 1999, Oxford, England. Four invited talks at three mini-symposia.

2000

11th Annual ACM-SIAM Symposium on Discrete Algorithm (SODA'2000), January 2000, San Francisco. Refereed paper was accepted by Program Committee.

Sixth Biennial Copper Mountain Conference on Iterative Methods (Copper'2000), April 2000, Copper Mountain, Colorado. Refereed paper was accepted by Program Committee.

2nd Conference on Numerical Analysis and Applications (NAA'2000), June 2000, Rousse, Bulgaria. Invited plenary talk (1 hour).

Annual International Conference IMACS on Application of Computer Algebra (ACA), June 2000, St. Petersburg, Russia. Invited plenary talk (50 minutes) and invited talk at mini-symposium.

14th International Symposium on Math. Theory of Network and Systems (MTNS'2000), June 2000, Perpignan, France. Invited talk at mini-symposium.

The Smalefest Conference in Hong Kong, July 2000. Two papers were refereed and accepted for the proceedings.

Annual ACM International Symposium on Symbolic and Algebraic Computation (ISSAC'2000), August 2000, St. Andrew's, Scotland. Refereed paper was accepted by Program Committee.

2001

International Conference on Complex Analysis and Applications. Moscow, Russia, June 2001. Invited talk (45 minutes) and a refereed paper accepted for the proceedings.

SIAM Annual Meeting, San Diego, California, July 2001. Invited talk at mini-symposium.

Annual ACM International Symposium on Symbolic and Algebraic Computations (ISSAC'2001), London, Ontario, Canada, July 2001. Refereed paper was accepted by the Program Committee.

2001 AMS-IMS-SIAM Summer Research Conference on Fast Algorithms in Math. Computer Science, and Engineering. S. Hadley, Massachusetts, August 2001. Invited Lecture (45 minutes).

2002

Annual International Symposium on Theoretical Aspects of Computer Science (STACS). March 2002, Juan Les Pins, France. Refereed paper was accepted by the Program Committee.

Seventh Biennial Copper Mountain Conference on Iterative Methods (Copper'2002), March-April 2002, Copper Mountain, Colorado. Refereed paper was accepted by the Program Committee.

International Conference on Structured Matrices, May-June 2002, Hong Kong, China. Invited talk at a mini-symposium.

First Joint Meeting of the American Mathematical Society and Unione Matematica Italiana (AMS/UMI'2002), Pisa, Italy, June 2002. Invited talks at a session.

Annual International Conference IMACS on Application of Computer Algebra (ACA), Volos, Greece, June 2002. Two invited talks at two mini-symposia.

Annual ACM Intern. Symp. Symbolic and Algebraic Computation (ISSAC'2002), Lille, France, July 2002. Refereed paper was accepted by the Program Committee.

International Symposium on Foundations of Computational Mathematics (FoCM'2002), Minneapolis, Minnesota, August 2002. Two invited talks at a mini-symposium.

5th Annual Conference on Computer Algebra in Scientific Computing (CASC'2002), Yalta, Crimea, Ukrain, September 2002. Refereed paper was accepted by the Program Committee.

2003

International Seminar on Matrix Methods and Operator Equations, Moscow, Russia, June 2003. Invited talk.

Workshop on Nonlinear Approximation in Numerical Analysis, Moscow, Russia, June 2003. Invited talk.

SIAM Conference on Linear Algebra (LA'03), Williamsburg, Virginia, July 2003. Invited talk at a mini-symposium and a contributed talk.

9th Annual International Conference on Applications of Computer Algebra (ACA'2003), Raleigh, North Carolina, July 2003. An invited talk at mini-symposium.

6th Annual Conference on Computer Algebra in Scientific Computing (CASC'2003), Passau, Germany, September 2003. Refereed paper was accepted by the Program Committee.

2004

Eighth Biennial Copper Mountain Conference on Iterative Methods (Copper'2004), March-April 2004, Copper Mountain, Colorado. Refereed paper was accepted by the Program Committee.

Mathematics of Computer Algebra and Analysis (MOCAA'2004). A talk by invitation by Program Committee.

16th International Symposium on Math. Theory of Network and Systems (MTNS'2004), July 2004, Leuven, Belgium. Refereed paper was accepted by the Program Committee.

6th Annual Conference on Computer Algebra in Scientific Computing (CASC'2003), July 2004, St. Petersburg, Russia. Refereed paper was accepted by the Program Committee.

6th International Mathematica Symposium (IMS 2004), August 2004, Banff, Canada, Refereed paper was accepted by the Program Committee.

2nd International Conference on Structured Numerical Linear Algebra Problems: Algorithms and Applications (Cortona 2004), September 2004, Cortona, Italy. Invited talk (30 minutes).

2005

International Conference on Matrix Methods and Operator Equations, Moscow, Russia, June 2005. Invited talk (30 minutes).

16th Annual ACM-SIAM Symposium on Discrete Algorithm (SODA'2005), January 2005, Vancouver, Canada. Refereed paper was accepted by Program Committee.

International Conference on Foundation of Computational Mathematics (FoCM'2005), July 2005, Santander, Spain. Two invited talks (50 minutes and 25 minutes) at two mini-symposia.

International Workshop on Symbolic-Numeric Computation, July 2005, Xi'an, China. Invited plenary talk (one hour).

Conference on Applications of Computer Algebra, July-August 2005, Nara, Japan. Invited talk at mini-symposium.

2006

Nineth Biennial Copper Mountain Conference on Iterative Methods (CMCIM'06), April 2006, Copper Mountain, Colorado. Refereed paper was accepted by the Program Committee.

International Conference on Algebraic Computational Geometry, Nice, France, June 2006. Invited talk (30 minutes).

Conference on Applications of Computer Algebra, Varna, Bulgaria, June 2006. Two invited talks at a mini-symposium.

SIAM Annual Meeting, Boston, Massachusetts, July 2006. Refereed paper was accepted by the Program Committee.

2007

The 6th International Congress on Industrial and Applied Mathematics (ICIAM'2007), Zurich, Switzerland, July 2007. Invited talk at a mini-symposium.

2nd International Conference on Matrix Methods and Operator Equations, Moscow, Russia, July 2007. Invited talk (30 minutes).

International Workshop on Symbolic-Numerical Computations (SNC'2007), London, Ontario, Canada, July 2007. Three refereed papers were accepted by the Program Committee.

2008

Tenth Biennial Copper Mountain Conference on Iterative Methods (CMCIM'06), April 2008, Copper Mountain, Colorado. Refereed paper was accepted by the Program Committee.

Third International Computer Science Symposium in Russia (CSR'2008), June 2008, Moscow, Russia. Refereed paper was accepted by the Program Committee.

The XIX International Workshop on Operator Theory and its Applications, July 2008, Williamsburg, Virginia. Invited talk at a mini-symposium.

Structured Linear Algebra Problems: Analysis, Algorithms, and Applications, Cortona, Italy, September, 2008. Invited talk, 30 minutes.

2009

International Conference on Polynomial Computer Algebra, St. Petersburg, Russia, April 2009. Invited Speaker.

The 3rd International Workshop on Symbolic-Numeric Computation (SNC 2009), Kyoto, Japan, August 2009. Invited talk (1 hour) and a refereed paper was accepted by the Program Committee.

SIAM Conference on Applied Linear Algebra, Oct. 26-29, Seaside, California, Oct. 26-29. Two invited talks at two mini-symposia.

2010

International Conference on Polynomial Computer Algebra, St. Petersburg, Russia, April 2010. Invited Speaker.

The Fifth International Computer Science Symposium in Russia (CSR'2010), June 2010, Kazan, Russia. Refereed paper was accepted by the Program Committee.

The 16-th ILAS Conference, Pisa, Italy, June 2010. Invited talk, 30 minutes.

Annual ACM International Symposium on Symbolic and Algebraic Computation (ISAAC'2001), Munich, Germany, July 2010. Refereed paper was accepted by the Program Committee.

2011

Annual ACM SIGSAM International Symposium on Symbolic and Algebraic Computation (ISAAC'2011), San Jose, CA, June 8-11, 2011. Refereed paper was accepted by the Program Committee.

The 4th International Workshop on Symbolic-Numeric Computation (SNC'2011), San Jose, CA, June 7-9, 2011. Refereed paper was accepted by the Program Committee.

3rd International Conference on Matrix Methods in Mathematics and Applications, Moscow, Russia, June 22-25, 2011. Plenary talk (1 hour) and invited talk (30 minutes).

The 7th International Congress on Industrial and Applied Mathematics (ICIAM'2011), Vancouver, British Columbia, Canada, July 18-22, 2011. Invited talk at a mini-symposium (30 minutes).

2012

SIAM International Conference on Linear Algebra, Valencia, Spain, June 18-22, 2012. Invited talk at a mini-symposium (30 minutes).

14th Annual Conference on Computer Algebra in Scientific Computing (CASC'2012), September 3-6, 2012, Maribor, Slovenia. Two refereed papers were accepted by the Program Committee.

2nd International Conference on Structured Numerical Linear Algebra Problems: Algorithms and Applications (Leuven 2012), September 10-14, 2012, Leuven, Belgium. Invited talk (30 minutes).

2013

The 17-th ILAS Conference, Providence, R.I., June 3-7, 2013. Four invited talks at three mini-symposia, 30 minutes each.

Annual ACM SIGSAM International Symposium on Symbolic and Algebraic Computation (ISAAC'2013), Boston, Massachusetts, June 23-26, 2013. Refereed paper was accepted by the Program Committee.

15th Annual Conference on Computer Algebra in Scientific Computing (CASC'2013), September 9-13, 2013, Berlin, Germany. A refereed paper was accepted by the Program Committee.

2014

The Ninth International Computer Science Symposium in Russia (CSR'2014), June 2014, Moscow, Russia. Refereed paper was accepted by the Program Committee.

The 5th International Workshop on Symbolic-Numeric Computation (SNC'2014), July 2014, Shanghai, China. Two refereed paper were accepted by the Program Committee.

16th Annual Conference on Computer Algebra in Scientific Computing (CASC'2014), September 8-12, 2014, Warsaw, Poland. Two refereed papers have been accepted by the Program Committee.

3rd International Conference on Structured Numerical Linear Algebra Problems: Algorithms and Applications, September 8-12, 2012, Kalamata, Greece. Invited talk (30 minutes).

2015

The 26th International Workshop on Operator Theory and its Applications, July 6–10, 2015, Tbilisi, Georgia. Invited talk at a mini-symposium (30 minutes).

Conference on Applications of Computer Algebra, Kalamata, Greece, July 20-23, 2016. Invited talk at a mini-symposium (30 minutes).

17th Annual Conference on Computer Algebra in Scientific Computing (CASC'2014), September 10–14, 2015, Aachen, Germany. Two refereed papers have been accepted by the Program Committee.

4th International Conference on Matrix Methods in Mathematics and Applications (MMMA-2015), August 24–28, 2015, Skolkovo/Moscow, Russia. Invited talk at a mini-symposium (30 minutes).

2015 SIAM Conference on Applied Linear Algebra, October 26–30, 2015, Atlanta, Georgia, USA. Invited talk at a mini-symposium (30 minutes).

2016

The Eleventh International Computer Science Symposium in Russia (CSR'2016), June 2016, Moscow, Russia. Refereed paper was accepted by the Program Committee.

Milestones in Computer Algebra (MICA 2016), July 16–18, 2016, University of Waterloo, Canada. Invited talk at a mini-symposium (30 minutes).

Workshop on Fast Direct Solvers, November 12–13, 2016, Purdue University, West Lafayette, Indiana. Invited talk (50 minutes).

2017

SIAM Conference on Computational Science and Engineering, February–March 2017, Atlanta, Georgia, USA. Invited talk at a mini-symposium (30 minutes).

4 Ph.D. STUDENTS OF CUNY SUPERVISED AND MENTORED BY VICTOR PAN

STUDENT NAME, THESIS DEFENSE, GRADUATION DATE, Ph.D. PROGRAM

- Atinkpahoun, A., April 11, 1995; June 1995, Computer Science
- Cebecioglu, H., May 23, 2001; October 2001, Mathematics
- Chen, Z.Q., November 9, 1999; February 2000, Mathematics
- Dias, O., November 26, 1996; January 1997, Mathematics
- Huang, X., July 1997; October 1997, Mathematics
- Landowne, E., November 1995; February 1996, Computer Science
- Lin, Y., March 1991; June 1991, Computer Science
- Murphy, B., March 27, 2007; May 2007, Computer Science
- Providence, S., December 14, 1999; February 2000, Computer Science
- Rami, Y., February 22, 2000; June 2000, Mathematics
- Retamoso Urbano, I.O., December 17, 2014; February 2015, Mathematics
- Rosholt, R.E., April 4, 2003; May 2003, Computer Science
- Sadikou, A., January 12, 1996; October 1996, Computer Science
- Serme, A., February 2008; May 2008, Mathematics

- Sobze, I., April 12, 1994; June 1994, Computer Science
- Stuart, C., April 1998; June 1998, Computer Science
- Tabanjeh, M.A., November 9, 1999; February 2000, Mathematics
- Taj–Eddin, I., March 27, 2007; September 2007, Computer Science
- Wang, X., April 4, 2003; May 2003, Mathematics
- Wolf, J., January 7, 2015; May 2015, Mathematics
- Yan, X., January 29, 2015; February 2015, Computer Science
- Yu, Y., April 1998; June 1998, Computer Science
- Zheng, A., October 16, 1997; January 1998, Mathematics

A. Atinkpahoun, O. Dias, S. Providence, A. Sadikou, A. Serme, and I. Sobze are African–Americans. H. Celecioglu, O. Dias and Y. Lin are females. At all the listed defenses, Victor Pan has served as the Mentor, the Advisor and the Chair of the Examination Committees.

Currently he advises five PhD students of CUNY: Liang Zhao (will defend his Thesis by May 2017), John Svadlenka, Qi Luan, Harpriya Chakraborty, and Vitaly Zaderman.

5 PERSONAL AND PROFESSIONAL DATA

5.1 PERSONAL DATA

- Born in Moscow, USSR.
- Immigrated to the U.S. in 1977
- U.S. Citizen since 1982
- Married
- Hobbies: Reading and writing poetry, Mountaineering, Swimming, Skiing and Cross-Country Skiing
- Languages: English, Russian, French

5.2 PROFESSIONAL DATA

5.2.1 HIGHER EDUCATION:

1956–1964: Department of Mechanics and Mathematics,
Moscow State University (MGU)

1961: M.S. in Mathematics

1964: Ph.D. in Mathematics (Thesis Advisor: A. G. Vitushkin)

5.2.2 EMPLOYMENT:

1988 – Visiting Professor, Professor, and Distinguished Professor (since 2000) at the Department of Mathematics and Computer Science of Lehman College of the City University of New York (CUNY) and in the Ph.D. Programs in Computer Science and (since 1999) in Mathematics of the Graduate Center of CUNY

1979–80 and 1981–1991 – Professor at the Computer Science Department of the State University of New York at Albany (SUNYA)

April–June 1981 – Visiting Professor
Computer Science Department, Stanford University, California

1980–81 – Visiting Member
the Institute for Advanced Study, Princeton, New Jersey

1977–79 and August 1980 – Visiting Scientist
IBM Research Center, Yorktown Heights, New York

1969–76 – Senior Researcher,
Department of Models for National Economy,
Institute of Economics, Academy of Science, Moscow, Russia

1965–69 – Senior Researcher,
Department of Computations for Economics,
Institute of Electronic Control Machines, Moscow, Russia

1964–65 – Junior Researcher,
Department of Computations for Economics,
Institute of Electronic Control Machines, Moscow, Russia

August 2002 – Visiting Scientist
Ontario Research Center in Computer Algebra (ORCCA),
Waterloo and London, Western Ontario, Canada

June 2002 – Visiting Scientist
Mathematics and Informatics Departments, University of Pisa, Italy

August-September 1998 – Senior Key Scientist
Mathematical Science Research Institute, Berkeley, California

July 1998 – Visiting Scientist
Fields Research Institute, Toronto, Canada

March–August 1996 and March–June 1997 – Invited Scientist
Project SAFIR, INRIA–Sophia Antipolis, France

January 1991 and July–August 1992 — Visiting Scientist
International Computer Science Institute, Berkeley, California

1989–90 – Visiting Professor
Computer Science Department, Columbia University, New York

July 1984 – Visiting Professor
Department of Mathematics, University of Pisa and CNR, Italy

5.2.3 CONSULTING:

- ATT Bell Laboratories, Murray Hill, New Jersey, 1991–1993
- General Electric Research and Development Center, Schenectady, New York, 1980

5.2.4 MEMBERSHIP IN PROFESSIONAL SOCIETIES:

- American Math. Society

  Designation of Fellowship for "Contributions to the Mathematical Theory of Computation, 2013
- Association for Computing Machinery
- Society for Industrial and Applied Mathematics
- European Association for Theoretical Computer Science
- International Linear Algebra Society

6 GRANTS AND AWARDS:

- Best Paper Award, Journal of Complexity (2000)
- NSF Grants (individual): $1,483,057 (1980–2004 and 2011–2016). NSF Grants (joint): $608,205 (2016–2020).
- 25 PSC-CUNY Awards: $123,078, 1989–2016
- CUNY Institute for Software Design and Development Grants: $8,000, 2001–2002
- Best Paper Award 2000, Journal of Complexity: $3,000 (shared)
- Shuster Foundation Award: $4,000, 1994–2000
- Lehman College CUNY, Faculty Award for Research and Scholarship: $1,000, 1994
- Institute for Advanced Study, Grant: $13,000, 1980–81
- SUNY University Award: $2,000, 1980

MOST RECENTLY:

- NSF Grant CCR 40211–0001,

  "Synthesis of Algebraic and Numerical Algorithms", $258,914

  (from 8/1/1998 to 7/31/2004)
- NSF Grant CCF–1116736,

  "Novel Methods for Fundamental Matrix and Polynomial Computations", $350,000

  (from 8/1/2011 to 12/31/2016)

- NSF Grant (joint with A. Ovchinnikov and C. Yap) CCF - 1563942 AF: Medium: Collaborative Research: Numerical "Algebraic Differential Equations", $608,205

  7/1/2016–6/30/2020

- PSC CUNY AWARD 65393–0034, $3,297

  "Algebraic and Numerical Algorithms", 6/30/2003 – 7/1/2004

- PSC CUNY AWARD 6643–7–0035, $3,495

  "Algebraic and Numerical Computing", 6/30/2004 – 7/1/2005

- PSC CUNY AWARD 67297–0036, $2,805

  "Matrix and Polynomial Computations", 6/30/2005 – 7/1/2006

- PSC CUNY AWARD 68291–0037, $3,176

  "Matrix and Polynomial Computations", 6/30/2006 – 7/1/2007

- PSC CUNY AWARD 69330–00–38, $3,990

  "Algebraic and Numerical Algorithms

  for Matrix and Polynomial Computations" 6/30/2007 – 7/1/2008

- PSC CUNY AWARD 61406–00–39, $3,800

  "Algebraic and Numerical Algorithms

  for Matrix and Polynomial Computations," 6/30/2008 – 7/1/2009

- PSC CUNY AWARD 62230–00–40, $4,300

  "Algebraic and Numerical Algorithms

  for Matrix and Polynomial Computations," 6/30/2009 – 7/1/2010

- PSC CUNY AWARD 63153–00–41, $2,860

  "Algebraic and Numerical Algorithms for Matrix and Polynomial Computations," 6/30/2010 – 7/1/2011

- PSC CUNY AWARD 64512–0042, $6,000

  "Matrix and Polynomial Computations," 6/30/2011 – 7/1/2012

- PSC CUNY AWARD 65792–0043, $11,998.92

  "Matrix and Polynomial Algorithms," 6/30/2012 – 7/1/2013

- PSC-CUNY Award 67699–00 45,

  "Advancing Matrix and Polynomial Computations", $6,000

  6/30/2014 – 7/1/2015

- PSC-CUNY Award 68862–00 46,

  "Advancing Matrix and Polynomial Computations", $11,998,

  7/1/2015–6/30/2016

7 SERVICE TO PROFESSION.

7.1 JOURNAL EDITING

Area Editor:

- Theoretical Computer Science (since 1985 to present)
- Computers and Mathematics (with Applications), (1980–2011)
- Calcolo (since 1999 to present)

Special Issues (Corresponding and Managing Editor):

- I. Z. Emiris, B. Mourrain, V. Y. Pan, Guest Editors. Special Issue on Algebraic and Numerical Algorithms, Theoretical Computer Science, 315, 2–3, 307–672, 2004
- Special Issue on Symbolic–Numerical Algorithms (D. A. Bini, V. Y. Pan, and J. Verschelde editors), Theoretical Computer Science, 409, 2,155–331, 2008
- Special Issue on Algebraic and Numerical Algorithms (I. S. Kotsireas, B. Mourrain, and V. Y. Pan, editors), Theoretical Computer Science, 412, 16, 1443–1543, 2011
- Special Issue on Algebraic and Numerical Algorithms (I. S. Kotsireas, B. Mourrain, V. Y. Pan, and Lihong Zhi, editors), Theoretical Computer Science, 479, 1–186, 2013

7.2 PROGRAM AND SCIENTIFIC COMMITTEES MEMBER

- ACM Annual International Symposium on Symbolic and Algebraic Computation (ISSAC 1999), Vancouver, British Columbia, Canada, July-August 1999
- ACM Annual International Symposium on Symbolic and Algebraic Computation (ISSAC 2007), Waterloo, Ontario, Canada, July-August 2007
- The 2nd International Workshop on Symbolic-Numeric Computation (SNC 2007), London, Ontario, Canada, July 2007
- The Annual International Conference on Polynomial Computer Algebra, St. Petersburg, Russia, Aprils of 2008–2015 (Eight Committees)
- The 4th International Workshop on Symbolic-Numeric Computation (SNC 2011), San Jose, California, June 2011
- International Symposium on Linear Algebra (ILAS 2013), Providence, RI, June 2013
- The 5th International Workshop on Symbolic-Numeric Computation (SNC 2014), Shanghai, China, July 2014

7.3 OTHER PROFESSIONAL ACTIVITIES

- Organization of Conferences, Conference Sessions and Minisymosia
- Refereeing and Reviewing for Professional Journals, Conferences and Surveys
- Lectures and Invited Lectures at Conferences in Computer Science, Mathematics, and Applied Mathematics in North and South Americas, Europe, Asia, and Australia (see the Lists of Publications and Talks at the Conferences)
- Colloquium Lectures at the Universities and Research Centers

8 SERVICE TO LEHMAN COLLEGE AND CUNY

8.1 SERVICE TO LEHMAN COLLEGE:

- Supervising Syllabi in Computer Science
- Advising students in Mathematics and Computer Science
- Observing Junior Instructors in Mathematics and Computer Science

8.2 SERVICE TO CUNY:

Teaching at the Graduate School and University Center (1989–2017, except for the sabbatical year of 1996–97)

Advising of Ph.D. Students: 23 Ph.D. Defenses (see the List of Ph.D. Defenses)

Serving As the Chair of 23 PhD Defense Committees in Mathematics and Computer Science (since 1991)

Membership in the CUNY's Committees:

- the Distinguished Professor Review Committee 2016
- the Distinguished Professor Selection Committee 2005–2013
- the Leadership Committee of the PhD Program in Computer Science 2012–2013 Committee 2016
- the Distinguished Professor Selection Committee 2016
- the PhD Defense Committees in Mathematics (12) and Computer Science (13) since 1991