For Your Information

New 2000 Mathematics Subject Classification Now in Effect

The revised version of the Mathematics Subject Classification (MSC2000) produced in collaboration by the editors of *Mathematical Reviews* and *Zentralblatt MATH (*see *Notices,* November 1998, page 1367) is being used for all items appearing in year 2000 and later issues of *Mathematical Reviews* and *Current Mathematical Publication*s.

The 2000 revision of the MSC replaces the version that has been in use since 1991. In the new classification, there are four new top level categories: 37 (Dynamical systems and ergodic theory), 74 (Mechanics of deformable solids)—which replaces Section 73 (Mechanics of solids), 91 (Game theory, economics, and social and behavioral sciences), and 97 (Mathematics education). There are no plans to review papers in mathematics education, but it was felt that having a classification number for it would be useful. Also, Section 04 (Set theory) has been subsumed under Section 03 (Mathematical logic and foundations).

Detailed information, as well as links to change and conversion information, can be found on e-MATH at `www.ams.org/msc/`.

—Sandra Frost

Open Letter on Mathematics Curricula Ignites Debate

The November 18, 1999, edition of the *Washington Post* carried an open letter decrying a Department of Education endorsement of school mathematics curricula. The letter, addressed to Secretary of Education Richard Riley, was signed by about two hundred mathematicians and scientists, including four Nobel Laureates and two Fields Medalists (a third Fields Medalist signed onto the letter after it appeared in the newspaper). The letter takes the department to task for endorsing mathematics curricula that have "serious mathematical shortcomings". It also criticizes the composition of the panel evaluating the curricula, saying that the panel "did not include active research mathematicians."

The letter was prepared and circulated by six professors who have been at the forefront of mathematics education debates in recent years. They are listed on the letter in the following order: David Klein of California State University, Northridge; Richard Askey of the University of Wisconsin at Madison; R. James Milgram of Stanford University; H. H. Wu of the University of California, Berkeley; Martin Scharlemann of the University of California, Santa Barbara; and Betty Tsang of the National Superconducting Cyclotron Laboratory at Michigan State University. The Fields Medalists signing the open letter are Paul Cohen of Stanford, Vaughan Jones of UC Berkeley, and Edward Witten of the Institute for Advanced Study. The Packard Humanities Institute in Los Altos, California, paid about $70,000 to place the open letter as a paid advertisement in the *Washington Post*.

In 1994 Congress passed a law directing the Department of Education to establish "panels of appropriate qualified experts and practitioners" to make recommendations about which curricular programs are promising or exemplary. The purpose was to give teachers, administrators, policymakers, and parents information on which to base choices of curricular materials for schools. During 1999 the department also evaluated science programs, and during 2000 it will evaluate mathematics and science programs together.

The evaluation of mathematics programs began in 1997 with a call to mathematics curriculum programs to submit materials for review; in all, sixty-one submissions were received. The panel particularly sought out programs that reflect the thinking in the school mathematics standards issued by the National Council of Teachers of Mathematics (NCTM) and the benchmarks established by the American Association for the Advancement of Science.

The evaluation had three tiers. First, about one hundred teachers and others with expertise in mathematics education were recruited to assess the submissions; each submission was evaluated by a four-person team. A second group then examined the reliability of the data submitted by the curriculum developers in support of their programs. Finally, the top-level panel, consisting of fifteen scientists, mathematicians, and education experts, used all of the information and opinions gathered to make the final recommendations. The panel included two AMS members: former NCTM president Jack Price of California State Polytechnic University, Pomona; and Manuel Berriozabal of the University of Texas at San Antonio. Both are also members

of the Mathematical Association of America, as is another panel member, Genevieve Knight of Coppin State College.

The panel began their review in the winter of 1998. Their recommendations were known by the spring of 1999 but were announced publicly the following October. The panel recommended five programs as "exemplary" and five as "promising"; the full list of submitted programs was not made public. The five exemplary programs are: Cognitive Tutor Algebra, College Preparatory Mathematics, Connected Mathematics, Core-Plus Mathematics Project, and Interactive Mathematics Program. The five promising programs are: Everyday Mathematics, MathLand, Middle-School Mathematics through Applications Project, Number Power, and University of Chicago School Mathematics Project.

In recent debates over mathematics education reform, some of these programs have come in for harsh criticism, much of it by mathematicians in colleges and universities. Some examples of this criticism are presented in the open letter. The letter says that an examination by Askey of the Connected Mathematics program found that it "entirely omits the important topic of division of fractions." The letter also points to another critique, by Scharlemann, which found that "the standard multiplication algorithm for numbers is not explained in MathLand." In objecting to the composition of the evaluation panel, the letter questions the wisdom of including Steven Leinwand, a consultant to the Connecticut State Department of Education. The letter quotes an article by Leinwand in which he says that the teaching of pencil-and-paper computational algorithms is "counterproductive and downright dangerous."

Wu says that he was motivated to contribute to the open letter because, after the evaluation became public, "e-mail kept coming in from teachers and principals explaining…that they were under pressure to adopt the 'exemplary' items against their will." According to Wu, these people hoped that if some in higher education took a public stand "they would at least have something to fall back on in their fight against the adoption" of the "exemplary" curricula.

Once the open letter was drafted, it was posted on the Web site of Mathematically Correct, a California group that has been vocal in the mathematics education reform debates in that state. The posting motivated some people to sign the open letter; other signatures were gathered by the letter's six writers. Some signed on immediately upon reading the 1,000-word letter, while others spent time reading some of the supporting materials the letter cites. Despite the ad hoc process, 192 signatures were collected in about three weeks. At the time of this writing, the number of signatures had surpassed 200.

The open letter has stirred widespread reaction, prompting articles in the *New York Times*, the *Los Angeles Times*, *Education Week,* and the *Chronicle of Higher Education*. In those articles, Linda P. Rosen, the top mathematics adviser to Secretary Riley, is quoted as saying that the Department of Education stands firmly behind the evaluation. In particular, it seems unlikely the department will consider the open letter's suggestion that it "withdraw the entire list…and announce the withdrawal to the public."

Some mathematicians are concerned about the fact that the open letter conveys the impression that the entire mathematical community agrees with the letter's conclusions. In fact, there is no such clear-cut consensus on the issues the letter raises, which are quite complex. Hyman Bass of the University of Michigan, chair of the AMS Committee on Education, says that he was not asked to sign the open letter. After receiving inquiries about it from some colleagues, Bass wrote an e-mail message presenting some of his views on the whole affair. His message says that while the evaluation was "a very ill advised thing to do", the Department of Education had little choice in the matter, as it was acting on instructions from Congress.

Bass disagrees with many of the conclusions in the letter, but his main objection is that the letter has inserted the debate over mathematics curricula "into the world of journalism and politics, where…serious and balanced discussion will no longer be possible." He also expressed concern that "What appear to be very sensible reservations about what the Department of Education did [have] become in fact part of a veiled and systematic assault on the professional education community."

This latest skirmish in the "math wars", as the debate over mathematics education reform has come to be called, took place just as the NCTM was preparing the final draft of its revised standards. NCTM's complex revision process brought in views from a wide variety of individuals and groups. The hope was that the process would bring some peace between the warring factions and build consensus about how to address the problems of mathematics education. However, the open letter demonstrates that the divisions are as deep as ever.

—Allyn Jackson

About the Cover

The front cover shows a rather complicated minimal surface whose existence has been proved recently by Michael Wolf and me. From far away, it looks like a catenoid, intersected by three horizontal planes. However, the surface uses topology (it has genus 4) to circumvent this seemingly unavoidable intersection. With only one half of the same surface shown in the front object, the intricate inner shape becomes visible.

—Matthias Weber