Errata

for

Dated: 27Mar2002

J.B.Kuipers - Quaternions & Rotation Sequences
Princeton University Press

I am responsible for this list of errors (mostly typo's) since I furnished the publisher with camera-ready copy of each page. I wrote the book using LaTeX and sometimes (to avoid writing code) would copy related code, then forget to change subscripts or whatever. The publisher, on the other hand, kindly says such errors are inevitable in a book of this sort. So I merely corrected this list of found errata using the same font as that used in the book; each can quite easily be cut and pasted over the offending equation or portion of text. Sorry for the inconvenience. jbk

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On page 4: Add to References pg 365
EVES, HOWARD, An Introduction to the History of Mathematics, Fifth Edition, The Saunders Series, 1982

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On page 8: In Margin: **Rigor** Change: hueristic → heuristic

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On page 10: Before Equation (1.10) Change: $e^{i\theta} \rightarrow e^{\mathbf{i}\theta}$

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On page 13: 3rd line from bottom of page should read: $x = \pm\mathbf{i}b$

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On page 27: 6 lines up from bottom: Delete bracket [a(i,j) → a(i,j)
also 4 lines up from bottom: matrix A → matrix A (italicize A)

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On page 43: Change exerccises → exercises

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On page 71: 6 lines down Section 3.8.2 and angle π → an angle π

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On page 82: Between the two figures: Figure 4.22 to Figure 4.6

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On page 92: 2 lines from bottom: Figure ?? should read Figure 4.12

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On page 95: 8 lines from bottom: Change points west → points east
and just above Figure 4.15 period after See Figure 4.6

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On page 107:

$$
\begin{aligned}
= \; & p_0q_0 + \mathbf{i}p_0q_1 + \mathbf{j}p_0q_2 + \mathbf{k}p_0q_3 \\
& + \mathbf{i}p_1q_0 + \mathbf{i}^2p_1q_1 + \mathbf{ij}p_1q_2 + \mathbf{ik}p_1q_3 \\
& + \mathbf{j}p_2q_0 + \mathbf{ji}p_2q_1 + \mathbf{j}^2p_2q_2 + \mathbf{jk}p_2q_3 \\
& + \mathbf{k}p_3q_0 + \mathbf{ki}p_3q_1 + \mathbf{kj}p_3q_2 + \mathbf{k}^2p_3q_3
\end{aligned}
$$

— Cut these words off, & carefully trim this equation — to properly cover, when pasted over the incorrect — equation on the top of page 107 (align, replacing — the 2nd =). Sorry for the typo and inconvenience.

& near bottom of page: $\mathbf{a} \cdot \mathbf{b} = a_1b_1 + a_2b_2 + a_3b_3$ not $a_1b_1 + a_1b_1 + a_1b_1$

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On page 112: Margin: ... that **q** always ... → ... that q always ...

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On page 119: 12 lines up from bottom: reappeance → reappearance

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On page 121: In middle of page: $w = q\mathbf{i}q^* \;\rightarrow\; \mathbf{w} = q\mathbf{i}q^*$

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On page 124: In margin: **Triple Vector Product** show 2 eqations

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On page 134: At bottom of page: Figure ?? should read Figure 5.5

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On page 164: 2 lines below Eqn (7.11): change $\overline{ad}$ to $\overline{be}$

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On page 165: in matrix **A** element $a_{11} = v_1^2 + (v_2^2 + v_3^2)\cos\phi$

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On page 193: in Figure 8.1 $j = i \quad j = i \quad \rightarrow \quad j \neq i \quad j \neq i.$

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On page 194: In Figure 8.2 Axes: $i, j = 1$, 2, or 3 $\quad j \neq i$

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On page 195: 5 lines up $= a_0b_0 + \mathbf{i}a_1b_0 + \mathbf{j}a_0b_2 + \mathbf{k}a_1b_2$

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On page 210: Change whish → wish

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On page 245: 6 and 8 lines up: $p_3 \rightarrow p_2$ and $p_4 \rightarrow p_3$

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On page 249: 2nd part of Eqn (10.30) should be $= 1 + \mathbf{i}0 + \mathbf{j}0 + \mathbf{k}0$

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On page 251: In Eqn (10.34) Delete **u** from 1st line of q_3

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On page 262: In the left margin $T_{\Delta\psi}$ should read:

$$T_{\Delta\psi} = \begin{bmatrix} 1 & \Delta\psi & 0 \\ -\Delta\psi & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

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On page 365: Added the following reference:
Eves, Howard An Introduction to the History of Mathematics,
5th edition, 1982. The Saunders Series, page 382.

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On page 254: See Figure for Exercise 2; the last rotation in the sequence should be ρ —— not α. See last page of this document.

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Did I miss others? Please! Let me know.

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three radii from the origin to the three vertices is

$$V = \frac{1}{3}(\alpha + \beta + \delta - \pi)R^3$$

Exercises for Chapter 10

1. Verify Equation 10.11.

2. An alternative rotation sequence, illustrated below, uses *supplemental angles* (see note in the margin) instead of interior

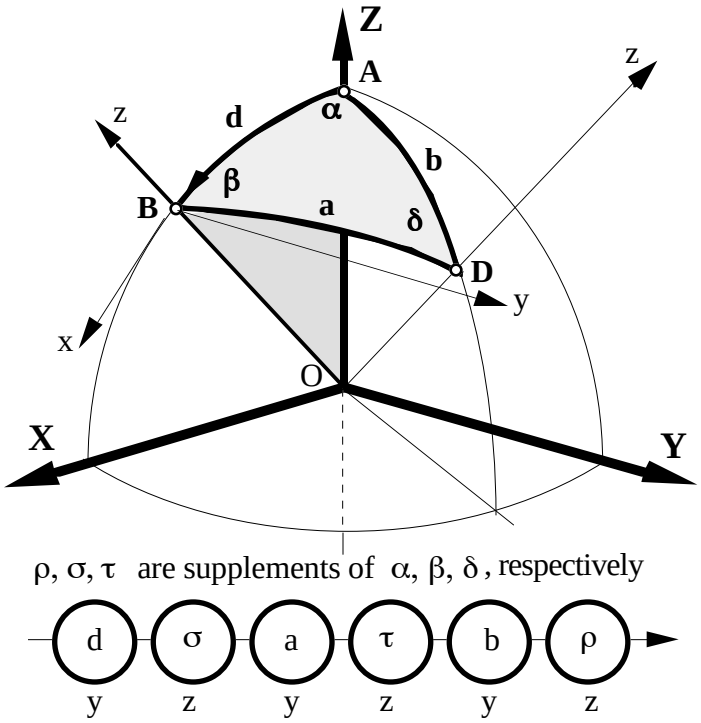
Supplemental Angle Notation

The supplemental angles at the three vertices of the triangle ABD, we define respectively, to be

$$\begin{aligned} \rho &= \pi - \alpha \\ \sigma &= \pi - \beta \\ \tau &= \pi - \delta \end{aligned}$$

Then

$$\begin{aligned} \sin\rho &= \sin\alpha \\ \cos\rho &= -\cos\alpha \\ &\textbf{etc.} \end{aligned}$$



New Rotation Sequence for Spherical Triangle

angles (see Figures 10.1 and 10.2). Using this sequence, derive new expressions for and then verify Equations 10.1, 10.2, 10.3, and 10.4.

3. Find the parameter relationship between an interior angle and the radian length of a side for an equilateral spherical triangle using matrix element T(2,1) instead of T(3,1).

4. Express the interior angle of a spherical regular 4-gon as a function of the radian length of a side, using the T^2 matrix elements $m(2,3)$ and $m(3,2)$.