

25[92-01].—R. BELLMAN, *Mathematical Methods in Medicine*, Series in Modern Applied Mathematics, Vol. 1, World Scientific Publishing Company, Singapore, 1983, xiv + 252 pp., 21½ cm. Price \$33.00 hardcover, \$18.00 paperback.

From the many applications of mathematics to medicine the author covers a selection centered around pharmacokinetics and radiation biophysics. The book starts with one-dimensional compartment models in continuous and discrete time, multicompartment models and the related ordinary differential equations and matrix problems, problems of parameter identification, positivity and conservation laws (Ch. 1–4). Then follows a general introduction to computers and basic numerical methods (Ch. 5, 6). Ch. 7 and 8 introduce calculus of variations and control theory; Ch. 9 and 10, the theory of dynamic programming and related analytic and computational aspects. A short Chapter 12 treats scanning procedures and tumor detection, while Ch. 13 introduces radiation dosimetry and ends with new results of the author on scattering and transmission functions. Though much of the material is elementary and well known (also at 1978), one will find many interesting facts and views, in particular on those topics (Ch. 7–10) which are typically not presented in elementary biomathematics text books. On the other hand, the book as a whole has serious deficiencies.

1. The presentation is arbitrary, eclectic, and inconsistent (e.g., on p. 31 the problem of multiple eigenvalues and associated eigenvectors is suppressed, but on p. 26 matrix power series, and on p. 37, Stieltjes integrals, appear *en passant*. The transpose of the matrix is used on p. 36, the adjoint (w.r. to the usual inner product) is introduced on p. 49 and is “formed by the interchange of rows and columns”. After the reader has just learned about round-off he is told that present (1978) large computers are far too small for most medical problems.

2. There are almost no examples or exercises, in particular no relation to real problems, real biological phenomena, real experiments or data.

3. The bibliography (the end of each chapter) refers almost exclusively to the author’s own work or books edited by him.

The book has some merits as a complementary reference. It can be used for the training of medical students or young mathematicians only after careful preparation.

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26[94B05, 05B40, 20D08].—THOMAS M. THOMPSON, *From Error-Correcting Codes through Sphere Packings to Simple Groups*, The Carus Mathematical Monographs No. 21, The Mathematical Association of America, Washington, D. C., 1983, xiv + 228 pp., 19 cm. Price \$21.00.

Undergraduate mathematics students may never see a theorem that was proved after their birth, prompting the question “Do people still do mathematics?” Moreover, one such student may have no idea how mathematicians work. Thompson’s book is an excellent solution to this problem. Using extensive interviews, he has