fifth chapter is devoted to functions of matrices, and the sixth to norms; then comes a chapter on perturbation theory, one on direct products and stability, and, finally, a chapter on nonnegative matrices.

The treatment is lucid, and the only prerequisites are elementary algebra and calculus. Only the real and complex fields are considered. There are a reasonable number of examples and exercises, and about three or four references per chapter for supplementary reading. The book provides an excellent background in the subject for prospective numerical analysts, as well as to the many nonmathematicians who need to use matrices in their work.

A. S. H.

67[7].—Irwin Roman, *Extrema of Derivatives of* $J_0(x)$, ms. of nine typewritten sheets (dated Jan. 1964), deposited in the UMT file.

This manuscript table gives to 10S the critical points below 100 and the corresponding extrema of the first four derivatives of the Bessel function $J_0(x)$. Accuracy to within two units in the final figure is claimed. Also tabulated are the (rational) values of these derivatives for zero argument.

A six-page introduction sets forth a detailed description of the method used in computing the tabular values on a desk calculator. In particular, formulas are listed relating the derivatives of $J_0(x)$ to linear combinations of $J_0(x)$ and $J_1(x)$, with coefficients expressed as polynomials in $1/x$. The values of these Bessel functions required in the computation of the table were obtained by interpolation in the Harvard tables [1].

A concluding page lists the six basic references cited in the introductory text.

As implied by the author, this unique table constitutes a natural supplement to published tables of extrema of $J_0(x)$, in particular, that compiled by the Mathematical Tables Committee of the British Association for the Advancement of Science [2].

J. W. W.

1. Harvard University, Computation Laboratory, *Annals*, v. 3: *Tables of the Bessel Functions of the First Kind of Orders Zero and One*, Harvard University Press, Cambridge, Mass., 1947. (See *MTAC*, v. 2, 1947, pp. 261–262, RMT **380.**)

2. British Association for the Advancement of Science, *Mathematical Tables*, v. 6: *Bessel Functions, Part I, Functions of Orders Zero and Unity*, Cambridge University Press, Cambridge, England, 1937. (See *MTAC*, v. 1, 1945, pp. 361–363, RMT **179.**)

68[7].—T. S. Murty & J. D. Taylor, *Zeros and Bend Points of the Legendre Function of the First Kind for Fractional Orders*, Oceanographic Research, Marine Sciences Branch, Department of Energy, Mines and Resources, Ottawa, Canada. Deposited in UMT file.

Let

$$P_\nu(x) = {}_2F_1\left(-\nu, 1 + \nu; \frac{1}{2}; \frac{1 - x}{2}\right)$$

$$P_\nu(x_j) = 0\,, \qquad P_\nu'(y_j) = 0\,.$$

The following are tabulated: