constraints $b_i \leqq x_i \leqq u_i$ by the variable transformation $x_i = b_i + (u_i - b_i)\sin^2(y_i)$). There is a wealth of material; much neglected work done by engineer optimizers is included. It is not a text book. It has no problems and no small numerical examples. The authors have achieved their main aim, to synthesize and explain the vast amount of algorithmic material now extant in the optimization area.

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47 [2.35, 5].—DAVID M. YOUNG, *Iterative Solution of Large Linear Systems*, Academic Press, New York, 1971, xxiv + 570 pp., 24 cm. Price $25.00.

In his 1950 Harvard thesis, David Young laid a solid theoretical foundation for the successive overrelaxation (SOR) method. Overall, this method perhaps remains the most useful method for the solution of large sparse systems of algebraic equations and, in particular, those which arise in the numerical solution of elliptic partial differential equations. The main topic of the present book is the study of the rate of convergence of the SOR method, its many variants and various semi-iterative methods. Much of the material is already quite familiar from Richard Varga's well-known textbook *Matrix Iterative Analysis* (1962). However, in recent years David Young and his coworkers have systematically explored many important aspects of the theory. Of perhaps greatest general interest are some new results on the use of a combination of the symmetric successive overrelaxation (SSOR) method with semi-iteration. For the standard second-order finite difference approximation to Laplace's equation and the natural ordering, good values for acceleration parameters can be found which lead to an order-of-magnitude gain in the rate of convergence (i.e., $R \sim h^{-1/2}$) compared to that of the optimal SOR method (i.e., $R \sim h^{-1}$).

The use of a line version of SSOR is shown to give further gains. It appears that further study of these potentially very powerful methods applied to more general elliptic problems could be very profitable.

This book requires only a background corresponding to a standard undergraduate mathematics program. The book is self-contained and admirably clearly written. The theory is illustrated by well-chosen examples worked out in sufficient detail. The usefulness of the book is further enhanced by many exercises. It is a most welcome addition to both the textbook and handbook literature.

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48 [7].—L. N. KARMAZINA, *Tablit͡sy funkt͡siĭ Lezhandra ot mnimogo argumenta* (*Tables of Legendre functions of imaginary argument*), Akad. Nauk SSSR, Moscow, 1972, x + 391 pp., 27 cm. Price 3.86 rubles.

This book consists mainly of a table of 7S values of the real and imaginary parts of $P_{-1/2+i\tau}(ix)$, in floating-point format, for $\tau = 0(0.01)15$ and $x = 0(0.1)2(0.2)5(0.5)10(10)60$.

As noted in the preface, the present table constitutes a natural sequel to a series of four earlier Russian tables [1]–[4] of the same function, wherein the tabular arguments were limited to real numbers.

A valuable introduction includes a set of formulas permitting the extension of the tables to corresponding negative values of τ and x. Also included therein are asymptotic series for Re $P_{-1/2+i\tau}$ and Im $P_{-1/2+i\tau}$, as well as expressions for these functions in terms of hypergeometric functions.

The introductory text contains a description of the tables and a brief discussion of their construction. Interpolation with respect to τ is shown to be feasible to full tabular precision by means of Lagrange formulas for three and four points. On the other hand, it is noted that such interpolation with respect to x is not practical in these tables, and direct calculation by the appropriate formula in the introduction is recommended by the author.

As noted in the introduction, these functions are encountered in applications of the Mehler-Fock transformation; in particular, they are useful in the solution of certain mixed boundary value problems in mathematical physics, such as the distribution of electricity on hyperboloids of revolution. Reference to such applications is included in the appended bibliography of nine titles.

J. W. W.

1. M. I. Z͡HURINA & L. N. KARMAZINA, *Tablit͡sy funkt͡siĭ Lez͡handra* $P_{-1/2+i\tau}(x)$, Tom I, Akad. Nauk SSSR, Moscow, 1960. [See *Math. Comp.*, v. 16, 1962, pp. 253–254, RMT **22**.]
2. M. I. Z͡HURINA & L. N. KARMAZINA, *Tablit͡sy funkt͡siĭ Lez͡handra* $P_{-1/2+i\tau}(x)$, Tom II, Akad. Nauk SSSR, Moscow, 1962. [See *Math. Comp.*, v. 18, 1964, pp. 521–522, RMT **79**(a); *ibid.*, v. 19, 1965, p. 692, RMT **123**, for a brief review of English translations of volumes 1 and 2.]
3. M. I. Z͡HURINA & L. N. KARMAZINA, *Tablit͡sy i formuly dli͡a sferic͡heskik͡h funkt͡siĭ* $P^m_{-1/2+i\tau}(z)$, Akad. Nauk SSSR, Moscow, 1962. [See *Math. Comp.*, v. 18, 1964, pp. 521–522, RMT **79**(b); *ibid.*, v. 21, 1967, pp. 508–509, RMT **66**, for a review of an English translation.]
4. M. I. Z͡HURINA & L. N. KARMAZINA, *Tablit͡sy funkt͡siĭ Lez͡handra*, Akad. Nauk SSSR, Moscow, 1963.

49 [7].—HENRY E. FETTIS, JAMES C. CASLIN & KENNETH R. CRAMER, *An Improved Tabulation of the Plasma Dispersion Function and Its First Derivative*—Part I—*Argument with Positive Imaginary Part*; Part II—*Argument with Negative Imaginary Part: Zeros and Saddle Points*, Reports ARL 72-0056 and 72-0057, Aerospace Research Laboratories, Air Force Systems Command, United States Air Force, Wright-Patterson Air Force Base, Ohio, July 1972, Part I, IV + 408 pp., 28 cm. and Part II, IV + 434 pp., 28 cm. Copies obtainable from the National Technical Information Service, Operations Division, Springfield, Virginia 22151.

Let

$$z(\rho) = \pi^{-1/2} \int_{-\infty}^{\infty} \frac{e^{-t^2}\, dt}{t - \rho}, \qquad \rho = x + iy,\ y > 0. \tag{1}$$

Then