similarity theory. To master the conditions of external heat and mass transfer, the basic information on hydrodynamics, turbulent flow and convection processes are presented, and the most significant works of the latest period including those by the author and his colleagues are given. The chapters presenting the methods of determining heat and mass transfer coefficients are written in quite a new fashion and with regard to the the latest achievements. The book contains a profound and very thorough review of that division of science which is the most applicable for building physics. New material, concrete data illustrating the inconsistency of these coefficients, their dependence on a great number of factors: temperature, moisture content, density, porosity are of particular value. Here, all the most essential appearing in recent literature is taken into account. Finally, the last chapter is of great interest from the point of view of novelty and contains experimental and numerical methods of solving differential equations.

One more distinctive important feature of the present book is worthy of note. It is a profound physico-mathematical interpretation of the questions with engineering applications. Almost every principal conclusion is accompanied by an example or illustration, diagrams, graphs and tables. This applies to the most complicated problems such as processes of moisture and heat transfer in capillary-porous systems in the presence of phase conversions for any region of temperature or the solution of non-linear differential equations of heat conduction with regard to a temperature variation of heat transfer coefficients and so on.

Finally, it is very important to note that there are a great number of the author's own original suggestions of a theoretical, methodical and experimental character. To say nothing of the author's methods of the determination of thermophysical properties of building materials, empirical regularities in the region of internal and external heat transfer. One should also note those specifications he introduces into the questions of heat transfer in protecting constructions under periodic temperature variations of the medium. Here the author has revised more precisely the main concepts of heat absorption and the index of thermal inertia. It is shown that they cannot characterize heat absorption of a construction in the manner usually adopted. Then the physical essence of the process is revealed, the true criterion characterizing it is determined and the role of the Predvoditelev function in forming this criterion is noted.

However, some drawbacks may be marked in this great and interesting work produced by the author, some places require improvement. Thus, for example, it seems to be insufficiently proved that there exist no solutions for heat and mass transfer problems in the presence of the dependence of thermophysical characteristics on co-ordinates and time. It is very necessary to take into account this circumstance for the walls of houses where moisture content and temperature vary with depth. In Chapter 9 where the review of experimental methods is given one would like to see a system of classification of the methods presented and, especially, recommendations on the advisability of applying this or that method to a particular problem.

The question of building physics considered in Chapters 7 and 8 would only be of benefit if they were developed and supplemented.

It is not clear why section 6 on unsteady heat conduction in a solid was included in the chapter on external heat transfer.

Undoubtedly, these minor shortcomings are not important and can be easily removed. Undoubtedly, the book reviewed will be of use and cause great interest among thermal physicists and builders.

A. F. CHUDNOVSKY

Tables of Integral Error Functions and Hermite's Polynomials, O. S. BERLYAND, R. I. GAVRILOVA and A. P. PRUDNIKOV, Byelorussian Academy of Science Press Minsk, 1961 (*Tablitsy integral'nykh funktsii oshibok i polinomov Ermita*, Izd. AN BSSR), 164 pp.

FOR the first time there have been published tables of integral error functions and Hermite's polynomials. As is known, many problems of heat transfer theory, hydrodynamics, quantum mechanics and a number of other problems are reduced to solving ordinary differential equations of the second order:

$$y'' + 2xy' - 2ny = 0, \quad (1)$$

$$y'' - 2xy' + 2ny = 0, \quad (2)$$

$$y'' + 2xy' + 2ny = 0, \quad (3)$$

$$y'' - 2xy' - 2ny = 0. \quad (4)$$

Functions

$$i^n \operatorname{erfc} x = \int_x^\infty i^{n-1} \operatorname{erfc} u \, du \, (n \geq 1), \; i^0 \operatorname{erfc} x = \operatorname{erfc} x$$

$$= \frac{2}{\sqrt{(\pi)}} \int_x^\infty e^{-u^2} \, du, \quad (1a)$$

(integral error functions),

$$H_n(x) = (-1)^n e^{x^2} \frac{d^n}{dx^n} (e^{-x^2}) \quad (2a)$$

(Hermite's polynomials)

$$i^{-n} \operatorname{erfc} x = \frac{2}{\sqrt{(\pi)}} e^{-x^2} H_{n-1}(x), \quad (3a)$$

$$H_{-n}(x) = \frac{\sqrt{(\pi)}}{2} e^{x^2} i^{n-1} \operatorname{erfc} x \quad (4a)$$

satisfy these equations, respectively. For convenience sake in making up tables the following functions are introduced:

$$I_n \operatorname{erfc} x = A_n i^n \operatorname{erfc} x (n \geq 0)$$

and

$$H^{*}_{2n}(x) = \frac{H_{2n}(x)}{B_{2n}},\ H^{*}_{2n-1}(x) = \frac{H_{2n-1}(x)}{B_{2n}}$$

where $A_n = 2^n\Gamma[1 + (n/2)]$ and $B_{2n} = (-1)^n[(2n)!/n!]$. Here a very successful choice of the coefficients A_n and B_{2n} which permits a quick variation of integral error functions and Hermite's polynomials should be noted. The tables consist of two parts. The first part covers the functions of I_n erfc x and the second those of $H^{*}_{n}(x)$. At the beginning of both parts of the tables the coefficients A_n and B_{2n} are given with nine-valued digits. All the functions are calculated with each step by x equal to 0·01. The function of I_0 erfc x represents a separate table with six-valued digits for the values of x from 0 to 3·5. The functions of I_n erfc x are given:

(a) at $0 < x \leqslant 1{\cdot}0$ and $1 \leqslant n \leqslant 30$ with six-valued digits;
(b) at $1{\cdot}01 \leqslant x \leqslant 1{\cdot}5$ and $1 \leqslant n \leqslant 25$ with six-valued digits;
(c) at $1{\cdot}51 \leqslant x \leqslant 2{\cdot}0$ and $1 \leqslant n \leqslant 15$ with five-valued digits;
(d) at $2{\cdot}01 \leqslant x \leqslant 2{\cdot}5$ and $1 \leqslant n \leqslant 10$ with five-valued digits;
(e) at $2{\cdot}51 \leqslant x \leqslant 3{\cdot}0$ and $1 \leqslant n \leqslant 5$ with four-valued digits;
(f) at $3{\cdot}01 \leqslant x \leqslant 3{\cdot}5$ and $1 \leqslant n \leqslant 3$ with four-valued digits.

At $0 < x \leqslant 10$ for all values of $1 \leqslant n \leqslant 30$ Hermite's polynomials $H^{*}_{n}(x)[H^{*}_{0}(x) = 1]$ are given with six-valued digits.

Undoubtedly, the tables reviewed will be of great use to a broad section of scientific workers and engineers as well as for the students of senior courses studying the numerical solution of various problems on applied mathematical analysis.

A. V. Luikov

Integral Transformations and Operational Calculus, V. A. Ditkin and A. P. Prudnikov, State Publishing House of Physical and Mathematical Literature, Moscow, 1961 (*Integral'nye preobrazovania i operatsionnoe ischeslenie,* Gosudarstvennoe Izdatel'stvo Fiziko-Matematicheskoi Literatury), 524 pp.

One should welcome the appearance of this book *Integral Transformations and Operational Calculus* by V. A. Ditkin and A. P. Prudnikov. For the first time there is published a book which systematically expounds various information in the theory of integral transformations and operational calculus.

The publication of the book was extremely necessary since the methods of integral transformations and operational calculus are highly effective methods of applied mathematical analysis which in many cases permit, with the help of simple rules, the solution of complicated mathematical problems in various fields of modern natural science. These methods were successfully applied to mathematical physics; the theory of special functions; the calculation of integrals and summing functional series as well as to some problems of the number theory and so on. Operational methods play very important rôles in some modern branches of science and techniques such as: automation and telemechanics, the theory of follow-up systems, the heat transfer theory, atomic energetics etc. From this short summary it is clear that the publication of this book dedicated to integral transformations and operational calculus is a great event for a wide field of specialists, including both mathematicians and physicists, in the widest application of these terms.

The book contains the results of numerous investigations published in many periodicals and other works as well as a number of results obtained by the authors themselves. The book under review consists of two parts. The first one is devoted to the fundamentals of the theory and has five chapters. The first chapter deals with the elements of the theory of the Fourier transformations and some of their applications.

The second chapter which is dedicated to the Laplace transformation is the main and most extensive one. Here the Mellin transformation is also considered. Chapter 3 covers the Bessel integral transformation. A number of integral transformations based on the Bessel functions are referred to. In particular, the transformations of Hankel, Meyer and Lebedev–Kontorovich are investigated in this chapter. Chapter 4 gives a brief summary of the transformations of Meller–Fock, Hilbert and Laguerre. Chapter 5 deals with operational calculus. As is known, the desire to give a rigorous mathematical substantiation of the Heaviside formal rules led to the fact that operational calculus is expounded on the basis of the Laplace integral transformation; and the initial operator fundamental of operational calculus was replaced by the theory of functions of a complex variable with a wide application of contour integrals. However, the operator is one of the most common mathematical concepts, and the theory of linear operators is the most developed part of functional analysis and represents the basic apparatus of mathematical physics.

Such an extensive development of the operator theory also influenced the development of operational calculus. Absolute return to the viewpoint of the initial operator was made by Mikusinsky. He gave a rigorous operator substantiation of the Heaviside operational calculus and excluded the Laplace integral from the substantiation of operational calculus and, consequently, lifted restrictions connected with the behaviour of the considered functions at infinity. However, the elimination of the Laplace integral made it difficult to study the field structure of operators, since the Laplace integral is a natural way of presenting, by the functions of a complex variable, a field of operators. In the book reviewed this shortcoming was eliminated by introducing the Laplace generalized transformation with the help of which the Mikusinsky operator field reflects itself on a field in