Review

Mathematical Tables for the approximation of Geophysical Anomalies and reduction by Interpolation Polynomials by V.A. Kazinskii. Published by Pergamon Press, London, 1960, pp. *i-iv*, 1-94, price 35 sh.

The publication under review consists of eight chapters with eleven supplements and a foreword. The foreword briefly but clearly explains the scope and object of the publication. The first chapter on the principles underlying the tables is the most important and the key to the whole book. An approximate expression for integrals of the form

$$\int_s \phi \ (x, y, z) \Big|_{z_1}^{z_2} ds$$

is derived by expanding the integrand in terms of the polynomials of the second degree in x and y. The method of selection of nodal points is explained. This interpolation formula is used in the subsequent seven chapters for evaluating double integrals occurring in various geophysical problems. Terms beyond the second degree are omitted Although at places in the book, the author has referred to the order of error involved in approximation, a theoretical discussion of the remainder term if added, would greatly enhance its value. A little more explanation of the notation for differences would be helpful to readers, not very familiar with the subject. The full derivation of the interpolation formula may be given, in view of its importance. It is stated that the tables are not tied to rigorous conditions regarding the selection of interpolation network, reference surface and interpolation functions. The formula is capable of extensive applications as illustrated by the diverse fields in which it has been applied. These are—Anomalies and reductions of homogeneous and non-homogeneous bodies of arbitrary shape; Gravitational effect of irregularities in mine workings; vertical gradient of Gravity; Approximations for Plumb Line and Geoid—Spheroid deviations; Magnetic anomalies and reductions of bodies of arbitrary shape; approximation of the mass of a body. To facilitate quick evaluation of the double integrals occurring in studies in these fields, ready tables and graphs of the integrand functions are given in the eleven supplements. These, except for Supp. X. and XI, consist of simple and straight forward tables. Supp. I gives values of

$$\frac{1}{\rho} = \frac{1}{(x^2 + y^2 + z^2)^{1/2}}$$

for different x, y and z, the range for x and z being 500 and y=200. Values of x/ρ^3 are given in Supp. III and y/ρ^3, z/ρ^3 in Supp. VII. There is duplication in these supplements and both these could easily be combined into one reducing printing. The values in the tables in the supplements are shown as values of the different functions multiplied by 10^{-3}; in Supp. XI, the function is multiplied by $1 \cdot 10^{-3}$. This, however, does not seem to be so, *e.g.*, Supp. I;

$$\phi_z = \frac{1}{\rho} = \frac{1}{(x^2 + y^2 + z^2)^{1/2}} \cdot 10^{-3}$$

For $x = y = 0$ and $z = 1$, $1/\rho$ should be 1/1000 whereas in the tables it is 1000. This remark is applicable to other tables also. The values in the tables are thus 10^3 times the functions considered. The values of functions in Supp. IV, V and VII for x=y=z=0 seem to need clarification. In the expression for $S(\psi)$ on p. 17 the sign between the two terms in bracket should be plus. Also, in Supp. X, the plus sign between the last two terms in the bracket should be changed to product. The function in brackets in Supp. XI is presumably to be multiplied by $\cos^2 \psi/2$ and not $\cos \psi/2$. As the symbol $S(\psi)$ used in this table is more directly connected with Supp. X and Q is used for this function (p. 17), it is suggested that the same notation as in the text portion might be employed. As detailed tables of function of Supp. XI are given by Sollins, a reference to this would be helpful. Supp. X and XI may be combined by omitting values for multiples of Δg. Later editions will, no doubt, look into these aspects.

The publisher's notice concerning the quality of production and published price of the work explains the problems besetting translations from foreign languages. Considering the difficulty in evaluating double integrals in the geophysical problems involved, the publication should be welcomed by workers in the field.

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