represented in the survey comes from papers by Soviet authors. Indeed, this reflects the true state of affairs, that our mathematicians stand at the forefront in the application of probabilistic methods to differential equations."), and may or may not be a complete guide to the Soviet contributions to the subject. The extent to which it does summarize Russian work measures its usefulness, since it is full of "... it turns out that ..." and "... it has been proved that ...".

The second paper, however, is of no particular use. It is a survey of integer programming which makes passing reference to some Russian work but emphasizes the Western contributions to the subject. This is unfortunate, for one learns almost nothing about what the Russians are doing in this field. The inference is that they are doing very little, indeed. On the other hand, what remains of the survey seems to be—by and large—gleaned from survey papers published in the West (notably the papers of Dantzig (*Econometrica*, 1960), Balinski (*Management Science*, 1965), and Beale (*Operational Research Quarterly*, 1965)).

The mystery remains: why does the book exist in English?

M. L. BALINSKI

Graduate Studies Division
City University of New York
New York, New York 10036

30[7].—HENRY E. FETTIS & JAMES C. CASLIN, *A Table of the Complete Elliptic Integral of the First Kind for Complex Values of the Modulus*: III. *Auxiliary Tables*, Aerospace Research Laboratories, Office of Aerospace Research, United States Air Force, Wright-Patterson Air Force Base, Ohio, 1970, iv + 162 pp., 27 cm. Copies may be obtained from the Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314.

For the review of Parts I and II, see *Math Comp.*, v. 24, 1970, pp. 993–994, RMT 76.

Let

$$K(k) = K(R, \theta) = \int_0^{\pi/2} (1 - k^2 \sin^2 \lambda)^{-1/2}\, d\lambda, \qquad k = Re^{i\theta},$$

$$K'(k) = K(k'), \qquad k' = (1 - k^2)^{1/2} = \rho e^{-i\varphi}.$$

This report gives tables of the auxiliary functions

$$K(R, \theta) - F(R, \theta) = \left\{1 + \frac{2}{\pi} K'(R, \theta)\left[\ln \frac{4}{\rho} - 1 + i\varphi\right]\right\}, \qquad K'(R, \theta),$$

and

$$K'(R, \theta) - F'(R, \theta) = \left\{1 + \frac{2}{\pi} K(R, \theta)\left[\ln \frac{4}{R} - 1 - i\theta\right]\right\}, \qquad K(R, \theta),$$

for

$$R = 0.700(0.001)1.0, \quad \theta = 1°(1°)10°, \quad 10\text{ D}$$

and

$$R = 0.01(0.01)0.35, \quad \theta = 1°(1°)90°, \quad 10\text{ D}$$

respectively. The functions are interpolatable in the regions tabulated, and second central differences are provided.

Y. L. L.

31 [9].—ALAN FORBES & MOHAN LAL, *Tables of Solutions of the Diophantine Equation* $x^2 + y^2 + z^2 = k^2$, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, July 1969, x + 200 pp.

Table 2 lists all solutions $0 < x \leqq y \leqq z$ for all $k = 3(2)701$. Table 1 lists the number of such solutions, for each k, and the number of primitive solutions. These tables are an extension of an earlier table [1] which went to $k = 381$. (See the earlier review for more detail.)

The introduction here reports a few errors in the earlier table [1].

In the earlier review I noted that (empirically) if k is a prime p, written as $8n \pm 1$ or $8n \pm 5$, then there are exactly n solutions here. Here is a proof: By Gauss, (see *History of the Theory of Numbers* by L. E. Dickson, Vol. 2, Chapter VII, Item 20) the number of proper (that is, primitive) solutions of $m \equiv 1 \pmod 8$ as

$$m = x^2 + y^2 + z^2,$$

counting all possible permutations and changes of sign, and allowing x, y, or z to be 0, is

$$3 \cdot 2^{\mu+2} H,$$

where m is divisible by μ primes, and H is the number of properly primitive classes of binary quadratic forms of determinant $-m$ that are in the principal genus. For $m = p^2$, this becomes

$$6(p - (-1/p)) \tag{1}$$

proper solutions.

Each solution

$$p^2 = 0^2 + x^2 + y^2 \tag{2}$$

is counted 24 times by Gauss, but is omitted here. Each solution

$$p^2 = x^2 + x^2 + y^2 \tag{3}$$

is counted 24 times by Gauss and once here. Each solution

$$p^2 = x^2 + y^2 + z^2$$

is counted 48 times by Gauss and once here. Now examine

$$p = 8n \pm 1 \quad \text{and} \quad p = 8n \pm 5$$

separately, and allowing for the value of $(-1/p)$ in (1), and whether representations (2) and (3) do or do not exist, one finds that the $6(p - (-1/p))$ counts of Gauss become a count of n here in all four cases. Neat.

D. S.

1. MOHAN LAL & JAMES DAWE, *Tables of Solutions of the Diophantine Equation* $x^2 + y^2 + z^2 = k^2$, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, February 1967. (See *Math. Comp.*, v. 22, 1968, p. 235, RMT **23**.)