

QUERIES—REPLIES

50. A DEFINITE INTEGRAL (Q 41, v. 6, p. 125).

In the definite integral

$$I = \int_0^{\infty} u^{-1} \exp(-zu - u^{-2}) du$$

put $z = 2x^2$, $v = xu$ so that

$$I = \int_0^{\infty} v^{-1} \exp[-x^2(2v + v^{-2})] dv.$$

In this form the integral can be evaluated asymptotically by LAPLACE'S method.¹ $f(v) = 2v + v^{-2}$ has its maximum at $v = 1$, and for large x the integral is approximated by

$$\left[\frac{2\pi}{x^2 f''(1)} \right]^{\frac{1}{2}} \exp[-x^2 f(1)]$$

or

$$(\pi/3)^{\frac{1}{2}} x^{-1} e^{-3x^2}.$$

This approximation may be used to start an asymptotic expansion: successive terms may be computed from the differential equation stated in the query.

A. E.

¹ See D. V. WIDDER, *The Laplace Transform*. Princeton, 1946, p. 277-280.

EDITORIAL NOTE: DR. J. ERNEST WILKINS also obtained the dominant term of the asymptotic expansion of this integral for large values of x .

CORRIGENDA

- v. 3, p. 355, l. -12, for 10^{23} read 10^{83} .
- v. 6, p. 20, l. -5, for $n < 50$ read $n \leq 50$.
- v. 6, p. 25, l. 14, for 1.2(.5) read 1.2(.05).
- v. 6, p. 25, l. 14, for 2-3D read 3-4D.
- v. 6, p. 25, l. -20, for R52 read R53.
- v. 6, p. 32, l. -7, for JOHNSON read JOHNSTON.
- v. 6, p. 34, l. 7, for 1950 read 1949.
- v. 6, p. 34, l. 9, for 21 read 206.
- v. 6, p. 55, l. -4, for y_i read y_1 .
- v. 6, p. 58, l. 18, for 33 read 5.
- v. 6, p. 58, l. 20, for 35 read 5.
- v. 6, p. 61, l. -8, for 116 read 118.
- v. 6, p. 82, l. 6, for TABLIŠTY read TABLIŠY.
- v. 6, p. 86, l. -17, for $\rho = 0.6$ read $\rho = 0.0$.
- v. 6, p. 101, l. -11, for 7956 read 7556.

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