performing routine arithmetic operations upon large masses of data, provided that the rate of supply of data is commensurate with the operating speed of the computer. Is it then feasible to generate random function samples electronically within the computer? At any rate, at first sight, this idea seems promising. The noise and shot effects of a thermionic valve furnish random functions. A random pulse/blank train in a computer's binary decimal sequence generates a rectangular distribution, and can (at least theoretically) lead to an integrated Fourier series whose coefficients are distributed normally and independently over the complex domain [PALEY & WIENER [7]].

This is not however the place to enter into details, even were they less speculative: but it is a matter for consideration whether stochastic processes could be analyzed in the direct fashion suggested on an electronic computer, and, if so, whether they will be pervasive enough to warrant building a special unit into the computer to generate random functions; and this note will have served its purpose if it provokes research on this issue at the present opportune juncture, when a number of electronic computers are projected or under construction or in their developmental stages in various parts of the world.

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[1] D. R. HARTREE, *Calculating Machines, Recent and Prospective Developments and Their Impact on Mathematical Physics*, Cambridge University Press, 1947.

[2] P. H. LESLIE, "On the use of matrices in population mathematics," *Biometrika*, v. 33, 1945, p. 183–212. "Some further notes on the use of matrices in population mathematics," *ibid.*, v. 35, 1948, p. 213–245. "Distribution in time of the births in successive generations," R. Stat. Soc. *Jn.*, s. A, v. 111, 1948, p. 44–53.

[3] W. J. DUNCAN & A. R. COLLAR, "A method for the solution of oscillation problems by matrices," *Phil. Mag.*, s. 7, v. 17, 1934, p. 865–909.

[4] M. S. BARTLETT, "Some evolutionary stochastic processes," R. Stat. Soc., *Jn.*, s. B, v. 11 (in press).

[5] D. G. KENDALL, "Stochastic processes and population growth," R. Stat. Soc., *Jn.*, s. B, v. 11 (in press).

[6] J. E. MOYAL, "Stochastic processes and statistical physics," R. Stat. Soc., *Jn.*, s. B, v. 11 (in press).

[7] R. E. A. C. PALEY & N. WIENER, *Fourier Transforms in the Complex Domain*, Amer. Math. Soc., *Colloq. Pub.* no. 19, New York, 1934.

QUERY

33. LENHART TABLES.—As a supplement to the final number, 6, Nov. 1838, of *The Mathematical Miscellany*, v. 1, edited by CHARLES GILL (1805–1855), is a 16-page pamphlet, with its own title-page, as follows: *Useful Tables relating to Cube Numbers, Calculated and arranged* by WILLIAM LENHART, *York, Penn. Designed to accompany his general investigation of the equation* $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$, *published in the Mathematical Miscellany, vol. 1, page 114; and by him through his friend, Professor C. Gill, presented to the Library of St. Paul's College, Flushing, Long Island, May 4th, 1837.* As indicated in D. H. LEHMER, *Guide to Tables in the Theory of Numbers*, 1941, p. 64, this "rare table" "gives, for more than 2500 integers $A < 100\,000$, solutions of $x^3 + y^3 = Az^3$ in positive integers." On the back of the title page of this pamphlet is the following: "Besides the tables given here, the manuscript copy compiled with so much labor and care, by Mr. Lenhart, includes a Table,

'Containing a variety of Numbers between 1 and 100,000, and the roots, not exceeding two places of figures, of two cubes, to whose difference the numbers are respectively equal'; together with a Table,

'Exhibiting the roots of three cubes to satisfy the indeterminate equation

$$x^3 + y^3 + z^3 = A,$$

for all values of A, from 1 to 50 inclusive.'

"Both these tables are extremely curious, and are open to inspection of all who may wish to consult them. They are lodged in the library of St. Paul's College."

This was probably written by Gill.

Numbers I–IV of the *Mathematical Miscellany* were published at the Flushing Institute, which had become St. Paul's College when numbers V–VIII (1838–1839) were published. But by 1844 this College had ceased to function, and hence also its Library, no doubt.

Can any one tell us if the above mentioned ms. tables of Lenhart[1] (1787–1840) have been preserved in any library or have ever been published?

R. C. A.

[1] Lenhart made a number of excellent contributions to the *Mathematical Miscellany* and his nan e is mentioned several times in L. E. DICKSON, *History of the Theory of Numbers*, v. II; *Diophantine Analysis*, Washington, 1920. Many personal details are given in [S. TYLER], "The life of Lenhart the mathematician," *The Biblical Repertory and Princeton Review*, v. 13, 1841, p. 394–416. The name of the author of this anonymous article was taken from the *Index Volume*, 1871, of the *Repertory*. See also W. S. NICHOLS, "William Lenhart, the American Diophantist, potential actuary and mathematical testator of Professor Charles Gill," Actuarial Soc. Amer., *Trans.*, v. 21, 1920, p. 118-122, 124; note by W. A. HUTCHESON, p. 122–124. Also CALVIN MASON, York [Pa.] *Gazette*, 14 Sept. 1841.

That the Yorkshireman Gill, mathematician, and the first actuary in America (he prepared an Actuary's Report on the experience of The Mutual Life Insurance Co. of New York), does not appear in the *Dictionary of American Biography* is surely an oversight. See E. MCCLINTOCK, Actuarial Soc. Amer., *Trans.*, v. 14, 1913, p. 9-16, 212–237; v. 15, 1914, p. 11–39 + portrait, 228–270. "Historical sketch of the life of CHARLES GILL, Esq., late actuary of the Mutual Life Insurance Company of New York," Institute of Actuaries, *Assurance Mag.*, v. 6, 1857, p. 216–227. C. WALFORD, *The Insurance Cyclopædia*, v. 5, London, 1878, p. 394. *The International Insurance Encyclopedia*, New York, v. 1, 1910, p. 313. D. E. SMITH & J. GINSBURG, *A History of Mathematics in America before 1900*, Chicago, 1934, p. 89, 98–99. S. NEUMARK, "Note on the life of Charles Gill," *Scripta Mathematica*, v. 2, 1934, p. 139–142.

QUERIES—REPLIES

43. INTEGRAL EVALUATIONS (Q **22**, v. 2, p. 320).—In partial reply we may note that the integral

$$I(t) = \int_0^t \cos (a_0 + a_1x + a_2x^2)dx,$$

where the a's are real, may be evaluated in terms of the so-called FRESNEL integrals

$$C(u) = \int_0^u \cos (\tfrac{1}{2}\pi\theta^2)d\theta, \qquad S(u) = \int_0^u \sin (\tfrac{1}{2}\pi\theta^2)d\theta,$$