Bibliography


Taqqu (Eds.), *Theory and Applications of Long-Range Dependence* (pp. 527–556). Boston: Birkhäuser.


Bienaymé, I.-J. (1845). De la loi de multiplication et de la durée des familles. L’Institut, Journal Universel des Sciences des Sociétés Savantes en France et à l’Étranger, 10 (Series 5), 37–39. These proceedings were periodically reissued as Extraits des Procès-Verbaux des Séances — Société Philomathique de Paris. This paper is reprinted at the conclusion of Kendall (1975).


Engset, T. (1915). Om beregningen av vælgere i et automatisk telefonsystem. Unpublished manuscript (in Norwegian), written in Kristiania (Oslo). This 130-page typed manuscript was discovered in the files of the Copenhagen Telephone Company (KTAS) in 1995 by Villy Bæk Iversen; the presumed original of the manuscript was subsequently located in the Norsk Telemuseum, Oslo. Translation: (1998). On the calculation of switches in an automatic telephone system. (A. Myskja, Trans.). Telektronikk (Oslo), 94, 99–142; translation reprinted in Myskja & Espvik (2002, pp. 40–148). A biography of Engset has been prepared by Myskja (1998b).


Fibonacci (1202). *Liber abaci*. Pisa. Leonardo Pisano was known as Fibonacci.


Kenrick, G. W. (1929). The analysis of irregular motions with applications to the
energy frequency spectrum of static and of telegraph signals. *Philosophical Magazine*, 7 (Series 7), 176–196.


Lowen, S. B. (2000). Efficient generation of fractional Brownian motion for simulation of infrared focal-plane array calibration drift. *Methodology and Computing in Applied Probability, 1*, 445–456. Erratum: \( X(k) \) is improperly defined; the correct expression, for \( 0 < k < M \), is \( X(k) = (G_{1,k} + iG_{2,k}) \sqrt{S(k)/2} \), with all \( G_{1,k} \) and \( G_{2,k} \) independent, zero-mean, unit-variance Gaussian random variables.


BIBLIOGRAPHY


Teich, M. C. & Rosenberg, S. (1971). *N*-fold joint photocounting distribution for modulated laser radiation: Transmission through the turbulent atmosphere. *International Journal of Opto-Electronics*, 3, 63–76. Errata: The correct expression for Eq. (28) on p. 69 is $B = Q - \Lambda^{-1}$ where the elements of $Q$ are simply $Q_{ij}^{(2)}$, with $i, j = 1, 2, \ldots, N$. The lettering on Figure 1, p. 71, should read $R = 0, 0, 0.499, 0.998$. Reference 9 should read *Applied Optics* 10 (1971) 1664. Reference 28 should read *J. Appl. Phys.* 43 (1972) 1256.


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