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Gaussian random processes, by I. A. Ibragimov and Yu. A. Rozanov, Applications of Math., volume 9, Springer-Verlag, New York-Heidelberg-Berlin, 1978, x + 276 pp., $24.80.

A Gaussian law (= probability measure) P on a finite-dimensional vector space V is of the form $dP(x) = \exp(-Q(x))\, dx_J$, where Q is a quadratic polynomial and dx_J is Lebesgue measure on a linear variety (affine subspace) J. Such laws, also called *normal*, are staples of multivariate statistics ([1], [34], [43]), along with their relatives such as Wishart distributions.

Let $EX = \int X\, dP$, the mean of the (vector or scalar) X. In the rest of this review *Gaussian laws will all have mean* 0 unless otherwise stated. If A, B, C and D are any four linear forms on V, then $E(ABCD) = E(AB)E(CD) + E(AC)E(BD) + E(AD)E(BC)$. So, $E(A^4) = 3E(A^2)^2$, the first of a sequence of identities which characterize Gaussian laws on $\mathbf{R}^1$.

Given a probability space $(\Omega, \mathfrak{B}, \Pr)$ and any set T, a *Gaussian process* is any real function X on $T \times \Omega$ such that for each finite set $F \subset T$, $\{X(t, \cdot)\}_{t \in F}$ has a Gaussian law on $\mathbf{R}^F$. Let $X(t) \equiv X(t, \cdot)$.

If T is a Hilbert space H, the *isonormal* Gaussian process L maps H isometrically into an $L^2(\Omega, \Pr)$, with $EL(x, \cdot)L(y, \cdot) = (x, y)$, the inner product; this fixes the laws of L. For any Gaussian process X, there is a Y with the same laws and $Y(t, \omega) = L(g(t), \omega)$, where g maps T into some Hilbert space H. So L is *the* Gaussian process [13]; it clothes a pristine Hilbert space in full Gaussian attire.

Trajectories. Probabilists like to pick an ω and follow the wandering path, or sample function, $t \to X(t, \omega)$ ([3], [13], [20], [48]). The speed at which $\exp(-x^2/2)$ goes to 0 as $x \to \infty$ lets us make (almost) all paths continuous if $g(T)$ in H is compact enough. If $T = \mathbf{R}$, the process X is called *stationary* if all its laws are preserved by translations $t \to t + h$. For a stationary X