

# Smooth random functions and smooth random ODEs

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## Abstract

What is a random function? What is noise? The standard answers are nonsmooth, defined pointwise via the Wiener process and Brownian motion. It is equally possible, however, to define random objects via Fourier series with random coefficients, and this makes both concepts and computations simpler. In this talk we review these “smooth random functions.” Integrals give smooth random walks, which approach Brownian paths as the wavelength parameter  $\lambda$  shrinks to 0, and smooth random ODEs, which approach stochastic DEs of the Stratonovich variety. Numerical explorations become very easy in this framework.