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Inertial particles and explosive diffusions.

Some problems in the theory of inertial particles (drifters in ocean, moisture droplets in atmosphere, etc) lead to the stochastic equation

$$dx/dt = 1 - x^2 + \xi(t)$$

with exploding solutions.

We show how to extend the solutions for all t following to the physics behind the process, and compute the ergodic mean of x for two cases of ξ : Gaussian white noise and telegraph process. In the last case the result is applied to investigating the dependence of the Lyapunov exponent for inertial particles on two physically important parameters: Kubo number and Stokes number. (Received September 14, 2007)