Bifurcations in the presence of noise

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We discuss bifurcations in the presence of additive Brownian noise in the context of two elementary examples.

The first example is that of one-dimensional pitchfork bifurcation and the second example is that of a two-dimensional Hopf bifurcation.

In both cases, for the corresponding stochastic differential equations an ergodic stationary measure (stationary solution of the associated Fokker-Planck equation) can be calculated analytically. While this provides some information about the dynamics of the system, many important questions about the dynamics are not addressed by this fact. We discuss some of these.

References

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