An analysis of Phase Noise in Nonlinear Oscillators

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Abstract

A local moving orthonormal transformation has been used to rigorously study the phase noise in stochastic differential equations (SDE's) arising from oscillators. A general theory of phase and amplitude noise equations and corresponding Fokker-Planck equations are derived to characterize the dynamics of phase and amplitude error. An example on van der Pol oscillator is also studied by using the general theory. We will then compute Shannon capacity for another example on piece-wise linear oscillator.