How to disentangle different noise sources in empirical data

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If the behavior of a system should be grasped by the analysis of empirical data, using sophisticated methods, noise very often causes main problems. For example a periodic deterministic oscillation may resemble a chaotic dynamics by the influence of noise. Thus it is of great importance to know what kind of noise is in empirical data involved. Here we present a method, which allows by pure data analysis to distinguish and even partially quantify the deterministic dynamics, as well as the dynamical and the measurement noise contribution [1]. The system sees the dynamical noise and reacts on it, while the measurement noise is somehow added on the signals of the system. Here the system does not show any response to the noise, but only the quality of the empirical data is reduced.

[1] Phys. Rev. Lett. 97, 090603 (2006)