



High dimensional linear inverse modelling

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We introduce and demonstrate two linear inverse modelling methods for systems of stochastic ODE's with accuracy that is independent of the dimensionality (number of elements) of the state vector representing the system in question. Truncation of the state space is not required. Instead we rely on the principle that perturbations decay with distance or the fact that for many systems, the state of each data point is only determined at an instant by itself and its neighbours. We further show that all necessary calculations, as well as numerical integration of the resulting linear stochastic system, require computational time and memory proportional to the dimensionality of the state vector.