

Filtering for Stochastic Evolution Equations

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Abstract

Linear filtering problem for infinite-dimensional Gaussian processes is studied, the observation process being finite-dimensional. Integral equations for the filter and for covariance of the error are derived. General results are applied to linear SPDEs driven by Gauss-Volterra process observed at finitely many points of the domain and to delayed SPDEs driven by white noise. Subsequently, the continuous dependence of the filter and observation error on parameters which may be present both in the signal and the observation process is proved. These results are applied to signals governed by stochastic heat equations driven by distributed or pointwise fractional noise. The observation process may be a noisy observation of the signal at given points in the domain, the position of which may depend on the parameter.