

# Spatiotemporal filtering from fractal spatial functional data sequence

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**Abstract:** Pseudodifferential evolution models have been widely used in the description of biological, geophysical and environmental systems. We consider the case where functional sample information is available from such systems. Specifically, the observation model is defined in terms of a sequence of spatial realizations of the process of interest, solution to a spatiotemporal pseudodifferential equation, affected by additive strong Hilbertian white noise. In this paper, conditions for a stable computation of the solution to the associated functional filtering problem are established in terms of the covariance operator spectra of the process of interest and of the Hilbertian observation noise. In practice, such conditions are referred to the empirical spectra associated with the covariance operator estimators. A simulation study is developed to illustrate the relationship between the discretization level and the suitable application of the results derived in terms of the empirical spectral parameters.

**Keywords:** Fractal noise; functional spatio-temporal estimation; pseudodifferential evolution models.