



BISP8

**Eighth Workshop on
BAYESIAN INFERENCE IN STOCHASTIC PROCESSES**

Modeling Nonstationary Stochastic Processes Through Dimension Expansion

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We propose a novel approach to modeling nonstationary spatial fields. The proposed method works by expanding the geographic plane over which these processes evolve into higher dimensional spaces, transforming and clarifying complex patterns in the physical plane. By combining aspects of multi-dimensional scaling, group lasso, and latent variable models, a dimensionally sparse projection is found in which the originally nonstationary field exhibits stationarity. Following a comparison with existing methods in a simulated environment, dimension expansion is studied on a classic test-bed data set historically used to study nonstationary models. Following this, we explore the use of dimension expansion in modeling air pollution in the United Kingdom, a process known to be strongly influenced by rural/urban effects, amongst others, which gives rise to a nonstationary field.

Keywords:

Image Warping; Multidimensional Scaling; Gaussian Processes.

**ABSTRACT
TYPE**

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