

# Nonparametric Approach for Spatial-Temporal Model

Tingjin Chu\*

School of Statistics, Renmin University, Beijing, China, 100872

email: chutj03@ruc.edu.cn

## Abstract

The spatial-temporal data is very common in many areas, and spatial-temporal models are often used to find the underlying relationships among various factors and predict future trend through analyzing spatial-temporal data. In this paper, a nonparametric method is proposed to model spatial-temporal error process of spatial-temporal models. More specifically, spatial-temporal error process is approximated by a Karhunen-Loève expansion, and a Newton-Raphson algorithm is proposed to obtain parameter estimates. The proposed method is fast to compute, and its performance is illustrated in the simulation studies.

Keywords: Karhunen-Loève expansion, Spline Basis, Newton-Raphson algorithm,