

# Semiparametric spatio-temporal models with unknown and banded autoregressive coefficient matrices

Hongxia Wang<sup>1</sup>, Xuehong Luo<sup>1</sup>, and Long Ling<sup>2</sup>

<sup>1</sup>Nanjing Audit University

<sup>2</sup>Nanjing Normal University

May 28, 2021

## Abstract

We consider a new class of semiparametric spatio-temporal models with unknown and banded autoregressive coefficient matrices. The setting represents a type of sparse structure in order to include as many panels as possible. We apply the local linear method and least squares method for Yule-Walker equation to estimate trend function and spatio-temporal autoregressive coefficient matrices respectively. We also balance the over-determined and under-determined phenomena in part by adjusting the order of extracting sample information. Both the asymptotic normality and convergence rates of the proposed estimators are established. The proposed methods are further illustrated using both simulation and case studies, the results also show that our estimator is stable among different sample size, and it performs better than the traditional method with known spatial weight matrices.

## Hosted file

`autoregressive.pdf` available at <https://authorea.com/users/416386/articles/523954-semiparametric-spatio-temporal-models-with-unknown-and-banded-autoregressive-coefficient-matrices>