Spatial Econometrics Course

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Lecture Outline

Lecture 1: Maximum likelihood estimation of spatial regression models

(a) Spatial dependence
(b) Specifying dependence using weight matrices
(c) Maximum likelihood estimation of SAR, SEM, SDM models
(d) Computational issues
(e) Applied examples

Lecture 2: Mapping in MATLAB

(a) The role of mapping in spatial econometrics
(b) An introduction to Arc_MAT, a matlab mapping toolbox by LeSage
(c) ArcView shape files
(d) Demonstration of the GUI interface and various mapping functions
(e) Applied examples in the context of spatial econometrics

Lecture 3: Bayesian variants and estimation of spatial regression models

(a) Introduction to Bayesian variants of the spatial models
(b) Spatial heterogeneity
(c) Bayesian heteroscedastic spatial models
(d) Estimation of Bayesian spatial models
(e) Applied examples

Lecture 4: Model comparison

(a) Determining the appropriate spatial weight matrix
(b) Determining the appropriate model specification
(c) Determining appropriate explanatory variables
(d) Applied examples

Lecture 5: Missing values and Spatial Probit models

(a) Spatial autoregressive probit models
(b) Applied examples
(c) A spatial probit model with individual effects
(d) Applied examples
(e) Multinomial Spatial Probit models
(f) Applied examples

Lecture 6: The matrix exponential spatial specification (MESS)

(a) A unifying approach to spatial modeling
(b) Maximum likelihood MESS estimation
(c) Applied examples
(d) Bayesian estimation
(e) Applied examples
(f) Bayesian MCMC estimation
(g) Applied examples

Lecture 7: Spatial Econometric Modeling of Origin-Destination Flows

(a) Gravity models for Origin-Destination flows
(b) Extension to the case of spatial dependence
(c) Applied examples
(d) Bayesian MCMC estimation
(e) Applied examples

Reading List

The lecture notes represent a reasonably complete source that should be adequate. Here are some additional source materials that extend beyond the lecture notes and may be of interest to some.

Applied illustrations will be based on a public domain set of MATLAB functions for spatial econometrics available at: www.spatial-econometrics.com, along with documentation in the form of an Adobe Acrobat PDF document.

A student version of this software is available for $99 on the MathWorks Inc. website, www.mathworks.com, which will run all of the econometrics, spatial econometrics estimation and inference functions as well as the mapping functions in my toolbox.

Lecture 1: Maximum likelihood estimation of spatial regression models

Lecture notes.


**Lecture 2: Mapping in MATLAB**

This lecture will present some MATLAB functions I have written that allow reading ArcView shapefile and mapping in MATLAB. This is more convenient than having to exit the MATLAB software and use ESRI’s mapping software to produce maps.


**Lecture 3: Bayesian variants and estimation of spatial regression models**

Lecture notes.

**MCMC estimation:** a recent textbook entitled, *Bayesian Econometrics* by Gary Koop has MATLAB program examples of many aspects of Bayesian econometric modeling. See www.wiley.co.uk/koopbayesian/

**Lecture 4: Model comparison**


**Lecture 5: Spatial probit models**

Lecture notes.


Lecture 6: The matrix exponential spatial specification (MESS)

Lecture notes.


Lecture notes.