

INTRODUCTION

In this NOTEBOOK we develop the elements of spatial data analysis. The analytical methods divided into three parts: Part I. *Point Pattern Analysis*, Part II. *Continuous Spatial Data Analysis*, and Part III. *Areal Data Analysis*. This classification of spatial data types essentially follows the course text by Bailey and Gatrell (1995), hereafter referred to as [BG]. It should be noted that many of the examples and methods used in these notes are drawn from [BG]. Additional materials are drawn from Waller and Gotway (2004), (Cressie (1993), Anselin (1988), and a number of other more specific sources listed in the REFERENCES section at the end of this NOTEBOOK.

This course is designed to introduce both the theory and practice of spatial data analysis. The practice of spatial data analysis depends heavily on software applications. Here we shall use ARCMAP for displaying and manipulating spatial data, and shall use both JMPIN and MATLAB for statistical analyses of this data. Hence, while these notes concentrate on the statistical theory of spatial data analysis, they also develop a number of explicit applications using this software. Brief introductions to each of these software packages are given in Part IV of this NOTEBOOK, along with numerous tips on useful procedures.

These notes will make constant reference to files and programs that are available in the Class Directory, which can be opened in the Lab with the menu sequence:

Computer → Course Data Directories (T:) → ese502

The most relevant files are organized into three subdirectories: **arcview**, **jmpin**, and **matlab**. These are the three software packages used in the course. The files in each subdirectory are formatted as inputs to the corresponding software package. Instructions for opening and using each of these packages can be found in the Software portion (Part IV) of this NOTEBOOK.

To facilitate references to other parts of the NOTEBOOK, the following conventions are used. A reference to expression (3.4.7) means expression (7) in Section 3.4 of the same part of the NOTEBOOK. If a reference is made to an expression in another part of the NOTEBOOK, say Part II, then this reference is preceded by the part number, in this case, expression (II.3.4.7). Similar references are made to figures by replacing expressions numbers in parentheses with figure numbers in brackets. For example, a reference to figure II.3.4 means Figure 4 in Section 3 of Part II.