Spatial data analysis for geographic information science

Synopsis:

This book has been written to assist GISc students in learning the analysis of spatial data. However, GIS analyst, geographers, town planners, geologist, economists, epidemiologists, engineers, environmentalists, and business analysts will find this book a valuable reference on the subject matter. Chapters have been presented systematically on the basic concept of spatial data analysis with particular reference to analyses commonly found in GIS, i.e., point data analysis, line data analysis, area data analysis, and surface data analysis. Each chapter is backed by numerical examples and revision questions. Examples of practical applications are also included.

Spatial data analysis for geographic information science

Table Of Content:

Foreword

CHAPTER 1 SPATIAL DATA ANALYSIS

The Real World and GIS

GIS and Spatial Data

Models of Spatial Data

Vector Data Model

Raster Data Model

What is Spatial Data Analysis?

Spatial Processes and Spatial Patterns

Spatial Data and the Analysis on Them

Spatial Statistics, Spatial Data Analysis, and Spatial Autocorrelation

Problems with Spatial Data Analysis

Spatial Data Analysis and GIS

Exercise 1

CHAPTER 2 SPATIAL DATA MANIPULATION

Analyses Commonly Found in GIS

Measurements

Classification and Generalization

Query and Search

Buffering

Overlay

Vector Topological Overlay

Raster Overlay

Graphic Overlay

Surface Data Analysis

Slope and Aspect

Viewshed

Verticel Profile

Perspective View

Network Analysis

Exercise 2

CHAPTER 3 POINT DATA ANALYSIS

What is Point Data Analysis? Analyzing and Testing Point Pattern Quadrat Analysis Nearest-neighbour Analysis Ripley's K Function Problem in Point Data Analysis Applications of Point Data Analysis The Variance/mean Ratio Test The ? 2 Test The Kolmogorov-Smirnov Test Ripley's K Function Exercise 3

CHAPTER 4 LINE DATA ANALYSIS

What is Line Data Analysis?
Requirements of Network Data
Network as a Graph
Measures of Network Structure
Branching Network
Circuit Network
Modules for Network Analysis Applications
Minimum Spanning Tree
Optimum Path
Application of Network Analysis
Exercise 4

CHAPTER 5 AREA DATA ANALYSIS

What is Area Data Analysis?
Analyzing and Testing Area Pattern
Join Count Statistics
? 2 Statistics
Moran's Statistics
Local Moran's Statistics
Application of Area Data Analysis

Exercise 5

CHAPTER 6 SURFACE DATA ANALYSIS

What is Surface Data Analysis?

Organization of Surface Data

Methods of Surface Interpolation Trend Analysis (Global Method) Linear Interpolation (Local Method) Trend Analysis (Local Method) Geostatics (Local Method) Application of Surface Interpolation Exercise 6

APPENDIX

REFERENCES

INDEX