

Locational Analysis in Human Geography



dandelion.com

© 2008 AGI-Information Management Consultants
May be used for personal purposes only or by
libraries associated to dandelion.com network.

Second Edition

Peter Haggett

Professor of Urban and Regional Geography, University of Bristol

Andrew D. Cliff

University Lecturer in Geography and Fellow of Christ's College, Cambridge

Allan Frey

Senior Lecturer in Geography, University of Bristol



Edward Arnold

Contents

| | Page |
|---|-----------|
| Contents ¹ | v |
| Preface | ix |
| Acknowledgements | xiii |
| 1 On Geography | 1 |
| 1.1 Introduction | 1 |
| 1.2 Geography: the internal dialogue | 2 |
| 1.3 Geography: external relations | 10 |
| 1.4 Trends in geography | 12 |
| 1.5 Conclusions | 24 |
| Part One: Models of Locational Structure | 25 |
| 2 Interaction | 26 |
| 2.1 Introduction | 26 |
| 2.2 Interaction and spatial form | 26 |
| 2.3 Elementary interaction models | 30 |
| 2.4 Interpretation of model components | 33 |
| 2.5 Maximum entropy models | 40 |
| 2.6 Interaction fields | 47 |
| 2.7 Interaction territories | 55 |
| 2.8 Conclusions | 63 |
| 3 Networks | 64 |
| 3.1 Introduction | 64 |
| 3.2 Location of routes | 64 |
| 3.3 Network location | 69 |
| 3.4 Routes through networks | 76 |
| 3.5 Empirical studies of network structure | 86 |
| 3.6 Conclusions | 96 |

¹A detailed contents list appears at the beginning of each of the chapters. Starred sections (*) indicate areas which demand a fuller statistical background than is assumed in the remainder of the book.

| | | |
|----------|--|-----|
| 4 | Nodes | 97 |
| | 4.1 Introduction | 97 |
| | 4.2 Settlement patterns | 97 |
| | 4.3 Size distribution of settlements | 110 |
| | 4.4 Changes over time | 121 |
| | 4.5 Relationship between size and spacing of settlements | 126 |
| | 4.6 Impulse transmission between urban areas | 132 |
| | 4.7 Conclusions | 138 |
| | | |
| 5 | Hierarchies | 139 |
| | 5.1 Introduction | 139 |
| | 5.2 Functional hierarchies of settlements | 139 |
| | 5.3 Periodic and evolving settlement hierarchies | 153 |
| | 5.4 Specialized centres within the hierarchy | 161 |
| | 5.5 Hierarchic distortion due to agglomeration | 170 |
| | 5.6 Hierarchic distortion due to resource localization | 177 |
| | 5.7 Conclusions | 189 |
| | | |
| 6 | Surfaces | 191 |
| | 6.1 Introduction | 191 |
| | 6.2 Surfaces and gradients | 192 |
| | 6.3 Movement-minimization models: statement | 199 |
| | 6.4 Movement-minimization models: evaluation | 207 |
| | 6.5 Distortion of regular gradients | 211 |
| | 6.6 Surface change over time | 222 |
| | 6.7 Conclusions | 230 |
| | | |
| 7 | Diffusion | 231 |
| | 7.1 Introduction | 231 |
| | 7.2 The Hägerstrand model | 234 |
| | 7.3 The logistic curve | 238 |
| | 7.4 Central place diffusion | 240 |
| | 7.5 Diffusion barriers and corridors | 242 |
| | 7.6 Goodness-of-fit of diffusion models with reality | 244 |
| | 7.7 Epidemic models* | 247 |
| | 7.8 Conclusions | 257 |
| | | |
| | Part Two: Methods of Locational Analysis | 259 |
| | | |
| 8 | Data Collecting | 260 |
| | 8.1 Introduction | 260 |
| | 8.2 Geographical populations | 261 |
| | 8.3 Spatial sampling procedures | 267 |
| | 8.4 Data coverage problems | 282 |
| | 8.5 Conclusions | 290 |

| | | |
|-----------|---|-----|
| 9 | Map Description | 291 |
| | 9.1 Introduction | 291 |
| | 9.2 Mapping and measurement levels | 291 |
| | 9.3 Single component maps | 293 |
| | 9.4 Multicomponent maps | 301 |
| | 9.5 Probability mapping | 306 |
| | 9.6 The shape of map distributions | 309 |
| | 9.7 Maps as graphs | 313 |
| | 9.8 Co-ordinate systems for map data | 324 |
| | 9.9 Conclusions | 328 |
| 10 | Hypothesis Testing | 329 |
| | 10.1 Introduction | 329 |
| | 10.2 Spatial independence: the problem | 329 |
| | 10.3 Spatial independence: solutions | 336 |
| | 10.4 Spatial stationarity | 342 |
| | 10.5 Normality | 345 |
| | 10.6 Irregular collecting areas | 348 |
| | 10.7 Conclusions | 352 |
| 11 | Spatial Autocorrelation | 353 |
| | 11.1 Introduction | 353 |
| | 11.2 Concepts of autocorrelation | 354 |
| | 11.3 Testing for autocorrelation* | 356 |
| | 11.4 Autocorrelation in regression | 360 |
| | 11.5 Autocorrelation and correlogram analysis | 367 |
| | 11.6 Autocorrelation and hypothesis testing* | 374 |
| | 11.7 Conclusions | 377 |
| 12 | Scale Components | 378 |
| | 12.1 Introduction | 378 |
| | 12.2 Polynomial trend surface analysis | 379 |
| | 12.3 Analysis of variance* | 384 |
| | 12.4 Fourier and spectral analysis | 390 |
| | 12.5 Space-time spectral analysis | 406 |
| | 12.6 Conclusions | 413 |
| 13 | Point Patterns | 414 |
| | 13.1 Introduction | 414 |
| | 13.2 Quadrat counts, I: Probability distributions | 415 |
| | 13.3 Quadrat counts, II: Selection criteria | 422 |
| | 13.4 Quadrat counts, III: A regional example | 430 |
| | 13.5 Polygon techniques | 436 |
| | 13.6 Distance-based methods | 439 |
| | 13.7 Conclusions | 446 |

| | |
|--|-----|
| Part Three: Regional Applications | 449 |
| 14 Region Building | 450 |
| 14.1 Introduction | 450 |
| 14.2 The regional concept | 450 |
| 14.3 Regions as combinatorial problems | 460 |
| 14.4 Regions as assignment problems | 465 |
| 14.5 Regions as districting problems | 477 |
| 14.6 Nodal regions as graphs | 485 |
| 14.7 Conclusions | 490 |
| 15 Allocating | 491 |
| 15.1 Introduction | 491 |
| 15.2 The transportation problem | 492 |
| 15.3 The transportation algorithm | 497 |
| 15.4 Extensions of the transportation problem | 505 |
| 15.5 Further programming models* | 510 |
| 15.6 Conclusions | 515 |
| 16 Forecasting | 517 |
| 16.1 Introduction | 517 |
| 16.2 The basic space-time autoregressive model (STAR) | 518 |
| 16.3 Integrated space-time models (STIMA and STARIMAR) | 522 |
| 16.4 Model identification* | 525 |
| 16.5 Parameter variation over time and space* | 534 |
| 16.6 Purely spatial forecasting* | 539 |
| 16.7 Conclusions | 540 |
| Postscript | 541 |
| Appendix | |
| 1 Glossary of notation | 543 |
| 2 Statistical tables | 551 |
| References and author index | 559 |
| Further reading | 594 |
| Subject index | 597 |