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order) null models; 2.2.5 Interaction-based (second-order) null models; 2.2.6 Inferring process from (spatio-temporal) pattern; 2.2.7 Making the virtual forest more realistic; 2.3 Conclusions; Chapter 3 Aggregation and Segregation; 3.1 Background and motivating examples; 3.1.1 Basics of (discrete spatial) model structure; 3.2 Local averaging; 3.2.1 Local averaging with noise; 3.3 Totalistic automata; 3.3.1 Majority rules; 3.3.2 Twisted majority annealing; 3.3.3 Life-like rules
3.4 A more general framework: interacting particle systems3.4.1 The contact process; 3.4.2 Multiple contact processes; 3.4.3 Cyclic relationships between states: rock-scissors-paper; 3.4.4 Voter models; 3.4.5 Voter models with noise mutation; 3.5 Schelling models; 3.6 Spatial partitioning; 3.6.1 Iterative subdivision; 3.6.2 Voronoi tessellations; 3.7 Applying these ideas: more complicated models; 3.7.1 Pattern formation on animals' coats: reaction-diffusion models; 3.7.2 More complicated processes: spatial evolutionary game theory; 3.7.3 More realistic models: cellular urban models
Chapter 4 Random Walks and Mobile Entities4.1 Background and motivating examples; 4.2 The random walk; 4.2.1 Simple random walks; 4.2.2 Random walks with variable step lengths; 4.2.3 Correlated walks; 4.2.4 Bias and drift in random walks; 4.2.5 L evy flights: walks with non-finite step length variance; 4.3 Walking for a reason: foraging and search; 4.3.1 Using clues: localised search; 4.3.2 The effect of the distribution of resources; 4.3.3 Foraging and random walks revisited; 4.4 Moving entities and landscape interaction; 4.5 Flocking: entity-entity interaction; 4.6 Applying the framework
4.6.1 Animal foraging

Sommario/riassunto

A ground-up approach to explaining dynamic spatial modelling for an interdisciplinary audience. Across broad areas of the environmental and social sciences, simulation models are an important way to study systems inaccessible to scientific experimental and observational methods, and also an essential complement to those more conventional approaches. The contemporary research literature is teeming with abstract simulation models whose presentation is mathematically demanding and requires a high level of knowledge of quantitative and computational methods and approaches. Furth