Preface

The study of cities and regions—understanding their workings and evolution—is one of the grand challenges of twenty-first century science. As with much of science, mathematical modelling provides a significant contribution to this understanding. There have been major developments in this field over a fifty year period and indeed historical precedents back into the nineteenth century and indeed earlier. The provenance of this book is a series of lectures given in University College London in 2010–2011. Their objective is twofold: first, to provide an elementary introduction to the field, drawing attention to significant developments in the history of urban and regional modelling that are of contemporary relevance; and secondly, to draw the audience into the contemporary research agenda. To meet these objectives, the book has a relatively unusual structure. In the early chapters some of the iconic models of earlier eras are presented both to illustrate and fix ideas and because their underlying ideas have an ongoing role in current developments. For example, Lowry's 'Model of metropolis' is presented in Chap. 1, the retail model as a key demonstrator in Chap. 2 and variants of the Lotka-Volterra prey-predator model, embracing a spectrum from ecology to political science, in Chap. 3.

Models are representations of theories and the interdisciplinary nature of these underpinnings are outlined in Chap. 4. The following three Chaps. 5, 6 and 7—begin to add more depth so that the reader is equipped to approach the research challenges that are articulated in Chap. 9. Chapter 8 is an interlude that shows how urban and regional modelling is a part of the broader and now fashionable field of complexity science.

Because this material arises from a course of lectures, the book is inevitably short. I have sought to compensate for this by offering further reading and an extensive bibliography which connects both to the history and to contemporary research.

London, June 2012   Alan Wilson