

# 'A Map is the Greatest of All Epic Poems'

Spatial Mathematics cover



What is the best way to represent the population of provinces or counties – by absolute numbers or using population density? When computing an optimal truck route, how does the outcome differ depending on whether the criterion used is distance or time? How can US citizens' sense of safety be distorted when they see the target range of a missile positioned on another continent drawn as a circle on a Mercator map rather than on an azimuthal equidistant map, which is drawn such that the launch base is in the middle of the map. These issues, and many more, are raised in *Spatial Mathematics*, a book published by CRC Press in mid 2013. It is the first in a series on cartography, GIS and spatial science in theory and practice. The book gives numerous examples of analysing geodata using a GIS and mapping the results, with a clear-cut focus on the USA. Since the term 'mathematics' is in the title, one would expect an abundance of formulas but in fact the opposite is true. The only formulas I spotted were on pages 187 and 188, and these concern the simple case of computing mean and weighted mean. The book is not a stand-alone work but is instead backed up by software and data, mainly developed by ESRI and accessible through QR codes and hyperlinks. Occasionally, it feels more like an instruction manual than a book. It is the result of a collaborative effort between Sandra Lach Arlinghaus, mathematical geographer and adjunct professor at the University of Michigan in Ann Arbor, USA, and ESRI's educational manager Joseph J. Kerski. The latter stated – in an interview with *GIM International* in November 2009 – that spatial analysis is vital for making decisions and conducting research and therefore that geomatics professors must actively spread "the technology and methods throughout the campus by providing training and resources to everyone". Indeed, the book has been written for users of geodata rather than its collectors or software designers. Today the creation of digital maps is entirely

based on maths embedded in computer software. The preface states: "It is more important than ever to understand the mathematics behind the rapidly expanding array of maps and data," and "We believe that GIS provides an excellent way to teach mathematical concepts and skills through the visualisation of numbers." However, the book itself provides only a sense that maths is vital as it does not elaborate on any of its very principles. As such, the schema of the book is rather conceptual. Hence it would be suitable as a part of an introductory course on using GIS for undergraduate geography students, but it is too sketchy to serve geomatics students. Nevertheless, the conceptual approach conveyed by countless examples provides a vista on the many pitfalls which GIS users may face when applying tools carelessly. Each of the 10 chapters ends with a list of QR codes, hyperlinks and references to articles (co)authored by the first author. The 'Further Reading' section refers to the broader literature and comprises seven pages. The QR codes allow access to a broad pallet of software and data, and this might be the dawn of a successful new type of interactive learning. Each chapter is preceded by appealing quotes from British and American poets and writers including William Shakespeare, Robert Louis Stevenson, Lewis Carroll and Emily Dickinson. A line by the late Gilbert H. Grosvenor, former editor of *National Geographic Magazine*, paves the way to Chapter 9: "A map is the greatest of all epic poems".

*Spatial Mathematics – Theory and Practice through Mapping*, Sandra Lach Arlinghaus and Joseph J. Kerski, published by CRC Press, Taylor & Francis Group, 272 pages, 208 (colour) illustrations, ISBN hardback 13-978-1-4665-0532-2, GBP63.99.