



Statistical Analysis of Network Data with R (Use R!)

By Eric D. Kolaczyk, Gábor Csárdi

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Networks have permeated everyday life through everyday realities like the Internet, social networks, and viral marketing. As such, network analysis is an important growth area in the quantitative sciences, with roots in social network analysis going back to the 1930s and graph theory going back centuries. Measurement and analysis are integral components of network research. As a result, statistical methods play a critical role in network analysis. This book is the first of its kind in network research. It can be used as a stand-alone resource in which multiple R packages are used to illustrate how to conduct a wide range of network analyses, from basic manipulation and visualization, to summary and characterization, to modeling of network data. The central package is *igraph*, which provides extensive capabilities for studying network graphs in R. This text builds on Eric D. Kolaczyk's book *Statistical Analysis of Network Data* (Springer, 2009).

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Editorial Review

Review

“If students mastered this material, they would be well positioned to begin working on data and making further progress on their own. ... SANDR covers a lot of basic and important material while teaching the reader how to work with data and models in R. ... The book appears to be the only one available that covers the material at an introductory and practical level. ... On the whole, I am happy to recommend it.” (Earl C. Lawrence, Journal of the American Statistical Association, June, 2015)

“This book presents contemporary mathematical and statistical methods of networks analysis and their implementation in R, written by the experts in this field The monograph presents an excellent description of a wide span of operations possible on networks, and is very useful for researchers and students.” (Stan Lipovetsky, Technometrics, Vol. 57 (2), May, 2015)

“This book is a quite practical guide to get started with analyzing networks using the statistical software R. ... Relevant references are conveniently provided at the end of each chapter. ... it is a very nice hands-on introduction to the analysis of network data that gives a good overview suitable for applied scientists and statisticians.” (Klaus Nordhausen, International Statistical Review, Vol. 83 (1), 2015)

From the Back Cover

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About the Author

Eric D. Kolaczyk is a professor of statistics, and Director of the Program in Statistics, in the Department of Mathematics and Statistics at Boston University, where he also is an affiliated faculty member in the Bioinformatics Program, the Division of Systems Engineering, and the Program in Computational Neuroscience. His publications on network-based topics, beyond the development of statistical methodology and theory, include work on applications ranging from the detection of anomalous traffic patterns in computer networks to the prediction of biological function in networks of interacting proteins to the characterization of influence of groups of actors in social networks. He is an elected fellow of the American Statistical Association (ASA) and an elected senior member of the Institute of Electrical and Electronics Engineers (IEEE).

Gábor Csárdi is a research associate at the Department of Statistics at Harvard University, Cambridge, Mass. He holds a PhD in Computer Science from Eötvös University, Hungary. His research includes applications of network analysis in biology and social sciences, bioinformatics and computational biology, and graph algorithms. He created the igraph software package in 2005 and has been one of the lead developers since then.

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