Telecommunication Network Economics

Presenting a balance of theory and practice, this up-to-date guide provides a comprehensive overview of the key issues in telecommunication network economics, as well as the mathematical models behind the solutions. These mathematical foundations enable the reader to understand the economic issues arising at this pivotal time in network economics, from business, research, and political perspectives. This is followed by a unique practical guide to current topics, including app stores, volume-based pricing, auctions for advertisements, search engine business models, the network neutrality debate, the relationship between mobile network operators and mobile virtual network operators, and the economics of security. The guide discusses all types of players in telecommunications, including users, access and transit network providers, service providers (including search engines, cloud providers and content delivery networks), content providers, and regulatory bodies. Ideal for graduate students, researchers, and industry practitioners working in telecommunications.

Patrick Maillé has been with the Networks, Security and Multimedia Department of Telecom Bretagne (Institut Mines-Telecom) since 2002. He has written or co-written more than 60 papers on game theory and economic concepts applied to telecommunication ecosystems.

Bruno Tuffin has been with Inria in Rennes, France, since 1997. He has written or co-written more than 100 papers and two books on Monte Carlo and quasi-Monte Carlo simulation techniques for the performance evaluation of telecommunication systems, and on developing new Internet-pricing schemes and telecommunication-related economic models.

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From Theory to Applications

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Preface

Network economics is a very hot topic, at the same time from a research point of view (with several conferences devoted to the theme, plus a devoted section in most of the other main telecommunication conferences), from a political point of view (as highlighted by the network neutrality debate, the increasing discussion on volume-based pricing, etc.), and of course from a business point of view (encompassing advertisement pricing definition, spectrum selling and sharing, bundling of offers, etc.). We believe that it is very good timing to release a book on the issue, describing both the theory and key specific applications, because of all the economic issues that constantly pop up in telecommunications. It is probably a cornerstone time for a redefinition of the Internet business model. While writing (scientific) papers on network economics, we also had the feeling that there was some room for a (new) book in the area. Indeed, there was to the best of our knowledge no recent work mixing mathematical theory and deep analysis of the economic stakes that had appeared in telecommunications. As illustrations of the issues we have in mind, we can mention the network neutrality debate, the relations between mobile network operators and mobile virtual network operators, the management of application stores, the economics of security, auctions for advertisements on different media (content pages, applications, or search engines), etc. In all those cases the interactions among their components need to be described, together with a solid scientific foundation, leading towards a careful analysis. Our book is designed to have a balance between theory and practice. Finally, after around ten years of research experience in the area, we think that this book is an opportunity to put together all the pieces of our activity and to push the analysis one step further.

This book is a monograph, but we believe that it can be also considered as a textbook at the Master level, for instance, because it will include all the necessary theoretical material.

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About the authors

Patrick Maillé graduated from the Ecole Polytechnique and Telecom ParisTech, France, in 2000 and 2002, respectively. He has been with the Networks, Security and Multimedia department of Telecom Bretagne since 2002, where he obtained his PhD in applied mathematics in 2005, followed by a six-month visit to Columbia University in 2006. His research interests are in game theory and economic concepts applied to telecommunication ecosystems (resource pricing, routing, consequences of user selfishness for network performance). He has authored or co-authored more than sixty papers on those topics.

Bruno Tuffin received his PhD in applied mathematics from the Université de Rennes 1 (France) in 1997. Since then, he has been with Inria in Rennes. He spent eight months as a postdoc at Duke University in 1999. His research interests include developing Monte Carlo and quasi-Monte Carlo simulation techniques for the performance evaluation of telecommunication systems, and developing new Internet-pricing schemes and telecommunication-related economic models. He has published more than one hundred papers on those issues. He has also led or participated in several French and European projects, and co-organized several conferences. He is currently Associate Editor of *INFORMS Journal on Computing*, *ACM Transactions on Modeling and Computer Simulation*, and *Mathematical Methods of Operations Research*. He has written or co-written two books devoted to simulation: *Rare Event Simulation Using Monte Carlo Methods*, published by John Wiley & Sons in 2009, and *La simulation de Monte Carlo* (in French), published by Hermes Editions in 2010.