



# Malware Diffusion Models for Modern Complex Networks: Theory and Applications

By Vasileios Karyotis, M.H.R. Khouzani

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Malware Diffusion Models for Wireless Complex Networks: Theory and Applications provides a timely update on malicious software (malware), a serious concern for all types of network users, from laymen to experienced administrators. As the proliferation of portable devices, namely smartphones and tablets, and their increased capabilities, has propelled the intensity of malware spreading and increased its consequences in social life and the global economy, this book provides the theoretical aspect of malware dissemination, also presenting modeling approaches that describe the behavior and dynamics of malware diffusion in various types of wireless complex networks.

Sections include a systematic introduction to malware diffusion processes in computer and communications networks, an analysis of the latest state-of-the-art malware diffusion modeling frameworks, such as queuing-based techniques, calculus of variations based techniques, and game theory based techniques, also demonstrating how the methodologies can be used for modeling in more general applications and practical scenarios.

- Presents a timely update on malicious software (malware), a serious concern for all types of network users, from laymen to experienced administrators
- Systematically introduces malware diffusion processes, providing the relevant mathematical background
- Discusses malware modeling frameworks and how to apply them to complex wireless networks
- Provides guidelines and directions for extending the corresponding theories in other application domains, demonstrating such possibility by using application models in information dissemination scenarios

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### **Editorial Review**

#### About the Author

Vasileios Karyotis received his Diploma in Electrical and Computer Engineering from the National Technical University of Athens (NTUA), Greece, in June 2004, his M.Sc. degree in Electrical Engineering from the University of Pennsylvania, PA, USA, in August 2005 and his Ph.D. in Electrical and Computer Engineering from NTUA, Greece, in June 2009. Since July 2009 he is with the Network Management and

Optimal Design (NETMODE) Lab of NTUA, Greece, where he is currently a senior researcher.

Dr. Karyotis was awarded a fellowship from the Department of Electrical and Systems Engineering of the University of Pennsylvania (2004-2005) and one of two departmental fellowships for exceptional graduate students from the School of Electrical and Computer Engineering of NTUA (2007-2009).

His research interests span the areas of stochastic modeling and performance evaluation of communications networks, resource allocation, malware propagation and network science.

He has given various tutorial presentations in conferences, workshops and seminars, and he has been a TPC co-chair of the 2014 IEEE INFOCOM workshop on Dynamic Social Networks (DySON) and the 2015 IEEE ICC workshop on Dynamic Social Networks (DySON). He is a member of the Technical Chamber of Greece since 2004, and a member of the IEEE since 2003. He has participated in various R&D projects funded by the EC (FP6, FP7), the European Space Agency (ESA), and the Greek General Secretariat for Research and Technology (GSRT).

MHR. Khouzani received a B.Sc. degree in Electrical Engineering from Sharif University of Technology in 2006. He subsequently joined the University of Pennsylvania (UPenn) with a fellowship award. He received his Ph.D. in Electrical and Systems Engineering in 2011 with the best dissertation award among his graduation class. He has since held postdoctoral research positions with the Ohio State University (OSU), the University of Southern California (USC), Royal Holloway, University of London (RHUL), and most recently, Queen Mary, University of London (QMUL).

Dr. Khouzani's research is in the area of communication networks and cyber-security. He uses diverse analytical tools from areas such as probability, statistics, control theory, optimization, and decision and game theory, to contribute to the emerging field of the "science of security".

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