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978-1-009-08730-8 — Multilayer Network Science: From Cells to Societies

Oriol Artime , Barbara Benigni , Giulia Bertagnolli , Valeria d'Andrea ,

Riccardo Gallotti , Arsham Ghavasieh , Sebastian Raimondo , Manlio De Domenico

Frontmatter

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Cambridge Elements

Elements in the Structure and Dynamics of Complex Networks

edited by

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MULTILAYER NETWORK SCIENCE

From Cells to Societies

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Multilayer Network Science

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Abstract: Networks are convenient mathematical models to represent the structure of complex systems, from cells to societies. In the past decade, multilayer network science – the branch of the field dealing with units interacting in multiple distinct ways, simultaneously – was demonstrated to be an effective modeling and analytical framework for a wide spectrum of empirical systems, from biopolymer networks (such as interactome and metabolomes) to neuronal networks (such as connectomes), from social networks to urban and transportation networks. In this Element, a decade after the publication of one of the most seminal papers on this topic, the authors review the most salient features of multilayer network science, covering both theoretical aspects and direct applications to real-world coupled/interdependent systems, from the point of view of multilayer structure, dynamics, and function. The authors discuss potential frontiers for this topic and the corresponding challenges in the field for the future.

Keywords: multilayer networks, complex systems, multiplex networks, multilevel networks, interdependent systems

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