

Processes taking place on networks*

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ABSTRACT

In addition to studies of the structure of networks, which tell us what shape networks are, and studies of the evolution of networks, which tell us how they got to be that shape, a significant effort has been directed in recent years towards understanding the processes that take place *on* networks. It is natural to imagine that the network structures we observe in the Internet, social networks, metabolic networks, food webs, and so forth could affect traffic flow, epidemiology, and energy flows, among other things. This lecture will discuss some of the understanding that has developed about such processes, including simple model processes like random walks, diffusion, and percolation, and more realistic ones like coupled oscillators and SIR epidemics.

Mark Newman received his Ph.D. in theoretical physics from the University of Oxford in 1991. After doing post-doctoral work at Cornell University, he joined the faculty of the Santa Fe Institute in New Mexico, where he was a research professor until moving to the University of Michigan in 2002. He is currently Associate Professor of Physics and Complex Systems at Michigan, holding a joint appointment in the Physics Department and the Center for the Study of Complex Systems. His research focuses particularly on social networks, network epidemiology, and computer algorithms for network analysis.

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