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Introduction to complex network analysis

Abstract

A network is a set of agents pairwise connected by links. Despite the simplicity of this definition, the theoretical properties of networks are extremely rich and diversified. Most notably, networks turn out to be extremely flexible in modelling a broad variety of phenomena characterized by a large number of interconnected elementary units: social networks, the Internet and the WWW, sensor networks, ecological communities, biochemical systems, energy transportation networks, economic and financial networks, are just but a few examples. That is why all researchers working in any areas of science and engineering are potentially interested in the theory and applications of complex networks. The aim of this lecture is to briefly introduce the notions of complex network analysis, namely the basic definitions, a few useful indicators, and the most important network models.