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Elements in the Structure and Dynamics of Complex Networks
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RECONSTRUCTING NETWORKS

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Reconstructing Networks

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Abstract: Complex networks datasets often come with the problem of missing information: interactions data that have not been measured or discovered, may be affected by errors, or are simply hidden because of privacy issues. This Element provides an overview of the ideas, methods and techniques to deal with this problem and that together define the field of network reconstruction. Given the extent of the subject, the authors focus on the inference methods rooted in statistical physics and information theory. The discussion is organized according to the different scales of the reconstruction task, that is, whether the goal is to reconstruct the macroscopic structure of the network, to infer its mesoscale properties, or to predict the individual microscopic connections.

Keywords: network reconstruction, maximum-entropy inference, exponential random graphs, mesoscale structures, link prediction

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