

Cambridge Elements

Elements in the Structure and Dynamics of Complex Networks

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RECONSTRUCTING NETWORKS

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CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
978-1-108-72681-8 — Reconstructing Networks
Giulio Cimini, Rossana Mastrandrea, Tiziano Squartini
Frontmatter
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CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India
103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781108726818
DOI: 10.1017/9781108771030

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First published 2021

A catalogue record for this publication is available from the British Library.

ISBN 978-1-108-72681-8 Paperback
ISSN 2516-5763 (online)
ISSN 2516-5755 (print)

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Reconstructing Networks

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First published online: August 2021

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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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ISBNs: 9781108726818 (PB), 9781108771030 (OC)
ISSNs: 2516-5763 (online), 2516-5755 (print)

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