Contents

1 **A Map of Approaches to Temporal Networks** 1
Petter Holme and Jari Saramäki

2 **Fundamental Structures in Temporal Communication Networks** 25
Sune Lehmann

3 **Weighted, Bipartite, or Directed Stream Graphs for the Modeling of Temporal Networks** 49
Matthieu Latapy, Clémence Magnien, and Tiphaine Viard

4 **Modelling Temporal Networks with Markov Chains, Community Structures and Change Points** 65
Tiago P. Peixoto and Martin Rosvall

5 **Visualisation of Structure and Processes on Temporal Networks** 83
Claudio D. G. Linhares, Jean R. Ponciano, Jose Gustavo S. Paiva, Bruno A. N. Travençolo, and Luis E. C. Rocha

6 **Weighted Temporal Event Graphs and Temporal-Network Connectivity** 107
Jari Saramäki, Arash Badie-Modiri, Abbas K. Rizi, Mikko Kivelä, and Márton Karsai

7 **Exploring Concurrency and Reachability in the Presence of High Temporal Resolution** 131
Eun Lee, James Moody, and Peter J. Mucha

8 **Metrics for Temporal Text Networks** 149
Davide Vega and Matteo Magnani

9 **Bursty Time Series Analysis for Temporal Networks** 165
Hang-Hyun Jo and Takayuki Hiraoka

10 Challenges in Community Discovery on Temporal Networks 185
Remy Cazabet and Giulio Rossetti

11 Information Diffusion Backbone 203
Huijuan Wang and Xiu-Xiu Zhan

12 Continuous-Time Random Walks and Temporal Networks 225
Renaud Lambiotte

13 Spreading of Infection on Temporal Networks: An Edge-Centered, Contact-Based Perspective 241
Andreas Koher, James P. Gleeson, and Philipp Hövel

14 The Effect of Concurrency on Epidemic Threshold in Time-Varying Networks 259
Tomokatsu Onaga, James P. Gleeson, and Naoki Masuda

15 Dynamics and Control of Stochastically Switching Networks: Beyond Fast Switching 275
Russell Jeter, Maurizio Porfiri, and Igor Belykh

16 The Effects of Local and Global Link Creation Mechanisms on Contagion Processes Unfolding on Time-Varying Networks 313
Kaiyuan Sun, Enrico Ubaldi, Jie Zhang, Márton Karsai, and Nicola Perra

17 Supracentrality Analysis of Temporal Networks with Directed Interlayer Coupling 335
Dane Taylor, Mason A. Porter, and Peter J. Mucha

18 Approximation Methods for Influence Maximization in Temporal Networks 357
Tsuyoshi Murata and Hokuto Koga

19 Temporal Link Prediction Methods Based on Behavioral Synchrony 381
Yueran Duan, Qing Guan, Petter Holme, Yacheng Yang, and Wei Guan

20 A Systematic Derivation and Illustration of Temporal Pair-Based Models 403
Rory Humphries, Kieran Mulchrone, and Philipp Hövel

21 Modularity-Based Selection of the Number of Slices in Temporal Network Clustering 435
Patrik Seiron, Axel Lindegren, Matteo Magnani, Christian Rohner, Tsuyoshi Murata, and Petter Holme

22 A Frequency-Structure Approach for Link Stream Analysis 449
Esteban Bautista and Matthieu Latapy

Index 483