A Dynamic Model of Network Formation with Strategic Interactions[☆]

Michael D. König[a], Claudio J. Tessone[a], Yves Zenou[b]

[a] *Chair of Systems Design, Department of Management, Technology and Economics, ETH Zurich, Kreuzplatz 5, CH-8032 Zurich, Switzerland*
[b] *Stockholm University and Research Institute of Industrial Economics (IFN). Sweden.*

Abstract

We develop a network formation model where links are formed on the basis of agents' centrality while the network is exposed to a volatile environment introducing interruptions in the connections between agents. A remarkable feature of our dynamic network formation process is that, at each period of time, the network is a nested split graph. We show that there exists a unique stationary network whose topological properties completely match features exhibited by real-world networks. We also find that there exists a sharp transition in efficiency and network density from highly centralized to decentralized networks.

Key words: Bonacich centrality, network formation, social interactions, nested split graphs
JEL: A14, C63, D85

[☆] We would like to thank Phillip Bonacich, Yann Bramoullé, Ulrik Brandes, Guido Caldarelli, Sanjeev Goyal, Patrick Groeber, Matthew Jackson, Matteo Marsili, Fernando Vega-Redondo, Douglas White as well as the participants at the 2009 DIME conference in Paris, the 2009 Trento Summer School on "Innovation and Networks", the 2009 HSC Videoconference at the University of California San Diego, the 2009 workshop on the Economics of Social Networks at Laval University and the Microeconomic Theory seminar at University of California Berkeley, for their helpful comments.

Email addresses: mkoenig@ethz.ch (Michael D. König), tessonec@ethz.ch (Claudio J. Tessone), yves.zenou@ne.su.se (Yves Zenou)