

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Layer-crossing overhead and information spreading in multiplex social networks BYUNGJOON MIN, K.-I. GOH, Korea University — Many real-world systems consist of multiple different layers of networks and interplay between them. Taking such multiplexity into account is important to a complete understanding of the structure and dynamics of complex systems. In this respect, we propose and study a model of information or disease spreading on multiplex social networks, in which agents interact or communicate through multiple channels (layers), and there exists a layer-switching overhead for transmission across the interaction layers. The model is characterized by the path-dependent transmissibility over a contact, which is dynamically determined, dependent on both incoming and outgoing transmission layers due to the switching overhead. We formulate a generalized theory with a mapping to deal with such a path-dependent transmissibility, and demonstrate dependency of epidemic threshold and epidemic outbreak size with respect to multiplexity characteristics such as the densities of network layers, layer-crossing costs, and type of seed infections. Our results suggest that explicit consideration of multiplexity can be crucial in realistic modeling of spreading processes on social networks.

Byungjoon Min
Korea University

Date submitted: 12 Nov 2013

Electronic form version 1.4