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Directed percolation in temporal networks

Thursday, Nov 23rd, 2023, at 4.15 p.m.
Building C6.4, Lecture Hall II

Temporal networks are commonly used to represent systems where connections between elements are active only for restricted periods of time, such as telecommunication, biochemical reactions or social networks. The time-varying nature of such interactions determine several network properties, like connectivity and reachability, which can describe the spreading of a disease, the dissemination of information, or the accessibility of a public transport system over time. However, while isotropic percolation theory successfully describes connectivity in static networks, a similar description has not yet been developed for temporal networks. In this talk, we address this problem and formalise a mapping of the concept of temporal network reachability to percolation theory through a static lossless representation of temporal networks, called event graphs. We show that the limited-waiting-time reachability, a generic notion of constrained connectivity in temporal networks, displays a directed percolation phase transition in connectivity, with critical properties characterising a large set of temporal networks, landing them into the directed percolation universality class. These findings open up an avenue to apply theory, concepts, and methodology from the well-developed directed percolation literature to temporal networks.

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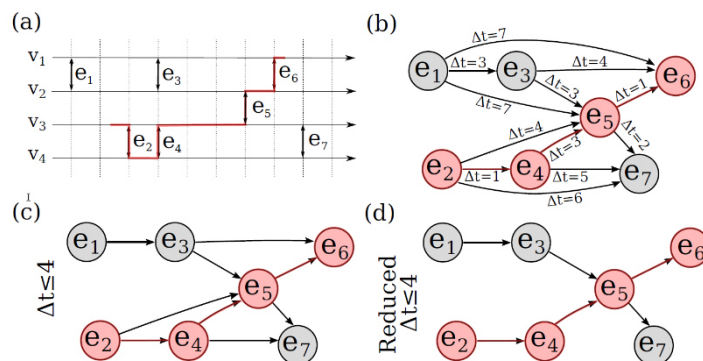
Dr. Philipp Hövel takes care of the guest.
Online via TEAMS: https://tinyurl.com/Karsai2311

Interested people are cordially invited.

Coffee and cookies are served at 4.00 p.m. in front of the Lecture Hall

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