

Fake News and First Passage Percolation on Random Graphs

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Fake news has been shown to spread faster than the truth, a phenomenon observed in multiple recent studies. In this talk, we present a simple mathematical model describing this process. The model is framed as a growth process with competition on a configuration model random graph. We begin by assigning to each vertex of the graph an inactive seed with probability $p \in (0, 1)$, representing individuals aware of the truth but not yet actively spreading it. Fake news spreads according to a first passage percolation model FPP_1 , starting from a small set of randomly chosen unseeded vertices and propagating at rate 1. Meanwhile, the truth spreads through a competing first passage percolation model FPP_λ , which originates from activated seeds — these seeds become active when either the fake news or the truth process first reaches their vertex. The truth then spreads at rate λ . In this talk, we present a fluid limit approximation that captures the limiting dynamics of the process on large graphs, starting from a small positive fraction of individuals spreading fake news. This is based on a joint work with P. Rodriguez.

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