

Searching for influential spreaders in complex networks via a message-passing algorithm

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Identifying the most influential spreaders is one of outstanding problems in network science and computational physics. So far, many approaches have attempted to rank the influence of nodes but there is still the lack of accuracy to single out influential spreaders. Here, we directly tackle the problem of finding important spreaders by solving the expected size of epidemic outbreaks when spreading originates from a single seed. We derive and validate a message-passing algorithm for calculating the size of epidemic outbreaks with a single seed [1]. In addition, we find that the probability to occur epidemic outbreaks is highly dependent on the location of the seed but the size of epidemic outbreaks once it occurs is insensitive to the seed.

[1] B. Min, *Eur. Phys. J. B* **91**, 18 (2018).