

RECIPROCITY IN A PREFERENTIAL ATTACHMENT NETWORK

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Abstract:

Reciprocity characterizes the information exchange between users in a network, and some empirical studies have revealed that social networks have a high proportion of reciprocal edges. Classical directed preferential attachment (PA) models, though generating scale-free networks, may give networks with low reciprocity. This points out one potential problem of fitting a classical PA model to a given network dataset with high reciprocity, and indicates alternative models need to be considered. We give one possible modification of the classical PA model by including another parameter which controls the probability of adding a reciprocated edge at each step. Asymptotic analyses suggest that large in- and out-degrees become fully dependent in this modified model, as a result of the additional reciprocated edges.