

A limited time information propagation in random graphs evolved by preferential attachment*

Natalia M. Markovich^[0000-0003-2936-7642]

V.A. Trapeznikov Institute of Control Sciences
Russian Academy of Sciences,
Profsoyuznaya Str. 65, 117997 Moscow Russia,
markovic@ipu.rssi.ru, nat.markovich@gmail.com

Abstract. The information propagation on random graphs evolved by a linear preferential attachment (PA) model is studied. The propagation is allowed within a fixed time interval. A vertice (a node) having a message instantaneously passes on information to one of its neighbour vertices which has not yet the message. This neighbour may be either a vertice newly appended to the graph or an existing vertice. By probabilities of α -, β - and γ -schemes of the used PA model a new edge is drawn between a new vertice appending to the graph to an existing vertice or a new edge is drawn between a pair of existing vertices. By convention the propagation is provided if the new node (or one of existing vertices) without the message has an incoming edge to an existing vertice having the information. Distributions of the number of vertices propagated by the message and the total number of vertices as well as the ratio of the latter numbers in the fixed time interval with regard to parameters of the PA are obtained.

Keywords: Information propagation · Directed random graphs · Evolution · Linear preferential attachment

* The authors were supported by the Russian Science Foundation RSF, project number 24-21-00183.