ОБОЗРЕНИЕ
ПРИКЛАДНОЙ И ПРОМЫШЛЕННОЙ
Том 23 МАТЕМАТИКИ Выпуск 2
2016

I. Fazekas [1], **C. Noszály**, **A. Perecsényi** (Debrecen, University of Debrecen). **A population evolution model and its applications to random networks.**

Key words and phrases: population evolution, score, asymptotic distribution, random graph, preferential attachment, scale free, Azuma–Hoeffding inequality.

Mathematics Subject Classification: 05C80, 60G42, 60J10.

The preferential attachment model was introduced by Barabási and Albert [1]. Their aim was to describe real-life networks such as the WWW. It was proved that the preferential attachment model leads to a scale-free random graph. A random graph is called scale-free if its asymptotic degree distribution is a power law. Following the paper of Barabási and Albert [1] several versions of the preferential attachment model were introduced. A general graph evolution scheme was offered in Ostroumova et al. [4]. That model covers lot of previous preferential attachment models. It was proved that the general model in [4] produces a scale-free random graph.

In our communication we present a further generalization of the model in [4]. We consider a general population evolution model where any individual is characterized by a score. During the evolution both the size of the population and the scores of the individuals are increased. Only a few general conditions are assumed concerning the number of the individuals and their scores. Then we show that the score distribution is scale-free. Finally, we apply our results to a random graph which is based on N-interactions (the N-interactions model was studied in Fazekas and Porvázsnyik [3] or Fazekas et al. [2]). We find that in the N-interactions model the weight distribution of the cliques is a power law.

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