# The asymptotic behaviour of a random graph model based on N-interactions

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**Abstract**

Examination of complex networks is currently one of the most popular research topics. During the last two decades, many real-world networks were studied. A main common characteristic of the most of real-world networks is their scale-free nature. Networks are called scale-free when their asymptotic degree distributions follow power laws ([1]).

In our paper, we describe a general random graph model evolving over discrete time. The evolution of the graph is based on the interaction of $N$ vertices. During the evolution both the preferential attachment choice and the uniform choice of vertices are possible. In this model every vertex is characterized by its degree and its weight. Besides the vertices, the cliques also have weights. The weight of an M-clique means the number of its interactions. Asymptotic results for the model are presented. Scale-free properties both for the degrees and the weights are proved.

*Keywords:* random graph, preferential attachment, scale-free, power law

*MSC:* 05C80, 60G42

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