

Empirical study and model of economic networks

Wataru Souma

*ATR Network Informatics Laboratories, 2-2-2 Hikaridai "Keihanna Science City",
Kyoto 619-0288, Japan*

Corresponding author e-mail: souma@atr.jp

Shareholding networks and trade networks in Japan are analyzed empirically, and a simple stochastic model is proposed to describe the dynamic growth of these networks. For shareholding networks, we make three observations: (i) Scale-free property (power law distribution of degree); strong correlation between degree and company assets; little or no correlation between degree and the company age. A minimal model is proposed based on the dynamics of the company growth, and constructed by a stochastic multiplicative process with reset events. It is shown through numerical simulation that our model can explain degree distribution very well. For trade networks, we consider topology of networks, correlation of sales between companies connected by links, and flow of money. Based on these empirical studies, we also consider production functions.