

M.Sc. Thesis Abstract

Multi-Agent Simulations in the Field of Social Sciences and Economics

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The thesis presents selected findings of sociophysics and econophysics. The *Wealth distribution models* created in the last decade to the form of the kinetic theory of gases are studied first. Empirical data for Hungary are shown to justify widespread assumptions in this field. Then a multitude of recent *Opinion formation models* are presented. The close connection to physics and models of ferromagnetic phase transition is expressed. In close connection to that, *Homophily in multi-agent models* describes the use of an important sociological term in modern models. The thesis deals with *Language dynamics models* in more detail.

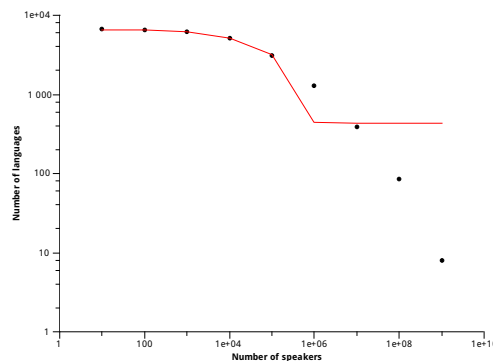


Figure 1. Cumulative first-language speaker frequency of languages of the world on a log-log scale, with second order exponential fit.

Based on empirical findings a novel multi-agent model is proposed that uses preferential attachment based on spoken languages and a simple economic model of language acquiring. The model has shown social hierarchy emergence based on language knowledge and wealth. We get qualitatively the same decay as the observed one in different empirical datasets for the distribution of language sizes. An exponential decay is replaced by a power law behaviour for larger languages, with the possibility of some even bigger outliers.

The author thinks that studying models where social phenomena are modelled by a large number of intelligent agents that follow social (homophily) and economical (profit maximisation) rules is beneficial. In the future we may see a growing number of similar models and applications in different fields.