AKSOE 2 Dynamics of Groups and Organizations II

Zeit: Freitag 14:00–16:00 Raum: TU P-N203

AKSOE 2.1 Fr 14:00 TU P-N203

Modelling the population dynamics of agricultural societies — •Dieter F. Ihrig — FH Suedwestfalen, Iserlohn, Germany

The growth of populations are generally described by the theories of Maltus (only birth and dead rate) and Verhulst (calculates the maximum food production, too). In agricultural societies there are much more influences: Fertilisation is increased with the amount of food production. This leads to a positive feedback because the value of the soil increases. Reversible forms of non-agricultural soil use (for example settlement) and non-reversible loss of soil (for example pollution) lead to a negative feedback. These effects are modelled and results are shown. The meagre the soil is the lower is the use or loss stimulated by socio-economic processes. Assuming that growth of socio-economic insight are following the same mathematical laws then other growing processes such effects are modelled; first results are shown. It is tried to apply the found solutions to other socio-economic phenomena like stock exchange prices.

AKSOE 2.2 Fr 14:30 TU P-N203

Let s have a party — •Marian Brandau and Steffen Trimper — Fachbereich Physik, Martin-Luther-Universität, Friedemann-Bach-Platz, 06108 Halle

We consider a homogeneous population of N agents which are interested in a party. Based on a simple model we analyse the behaviour of such a meeting particularly with regard to the appearance of a depletion effect. The agents evaluate their party by the comparison of their party with any other party. We take as criterion the number of friends at the several parties. The friends of each agent are exponentially distributed. After this proceeding they take the decision, either they stay on the party or they leave it and go to another one. Due to this interaction effects a collective movement will lead to enrich or become extinct of some parties. The simulations on a network show such an effect depending on the initial condition and the distribution of friends. In some cases all agents accumulate at one party at the end of the simulation. The simulations are confronted with an analytical approach based on an evolution model.

AKSOE 2.3 Fr 15:00 TU P-N203

The Impact of Election Results on the Member Numbers for the Large Parties in Germany — •Christian Hirtreiter[1] and Johannes J. Schneider[2] — [1]Institute of Organic Chemistry, University of Regensburg, Universitätsstr. 31, 93053 Regensburg, Germany — [2]Institute of Physics, Johannes Gutenberg University of Mainz, Staudinger Weg 7, 55099 Mainz, Germany

We investigate the relations between the numbers of members of various parties and their results in the elections in German states. The talk focuses on the question whether there is the same relationship between these data as in Bavaria, where we found for the CSU and the Bavarian SPD that the results in the two last elections induce a positive or negative trend on their member numbers.

[1] J. J. Schneider and Ch. Hirtreiter, The Impact of Election Results on the Member Numbers for the Large Parties in Bavaria and Germany, to be published in Int. J. Mod. Phys. C.

AKSOE 2.4 Fr 15:30 TU P-N203

Affecting Network Structures Through Selection Mechanisms — •Adrian Marcelo Seufert[1] and Frank Schweitzer[2] — [1]TU Berlin, Institut für Theoretische Physik — [2]D-MTEC ETH Zürich

We present a modification of a model due to Sanjay Jain and Sandeep Krishna of interacting components on a network structure that evolves in time. The nodes in the network can be identified with species in a common environment, and the interactions between different species are represented by links in a directed graph. Each species can be characterized by its population. The nodes are submitted to a simple linear dynamics that affects their populations. The dynamics is determined by the structure of the network, while at the same time influencing it by determining which nodes will be selected for mutation. Mutating nodes lose all their links and randomly set new links, thus modifying the network. A connected network appears in the model once an autocatalytic set appears by chance and engulfs the whole set of nodes.

We modify the model by introducing a new selection mechanism which makes selection dependent on the relative performance of the nodes. We show that by varying the performance threshold required for survival, we affect the structure of the emerging network, as measured by the size of its core, the clustering coefficient, and the out-degree distribution. Also, we observe a separation into two distinct regimes, a high performance regime and a low performance regime, as a function of the threshold.