AKSOE 12: Dynamics of groups and organizations IV

Time: Wednesday 14:45–17:15　　　　　　　　　　　　　　　　　　Location: EW 203

AKSOE 12.1　Wed 14:45　EW 203

Community dynamics in social networks — ●Gergely Palla[1], Albert-Làszlò Barabàsi[2], and Tamàs Vicsek[1] — [1]Statistical and Biological Physics Research Group of HAS, Budapest, Hungary — [2]Department of Physics, University of Notre Dame, USA

We study the statistical properties of community dynamics in large social networks, where the evolving communities are obtained from subsequent snapshots of the modular structure. Such cohesive groups of people can grow by recruiting new members, or contract by loosing members; two (or more) groups may merge into a single community, while a large enough social group can split into several smaller ones; new communities are born and old ones may disappear. We find significant difference between the behaviour of smaller collaborative or friendship circles and larger communities, eg. institutions. Social groups containing only a few members persist longer on average when the fluctuations of the members is small. It appears to be almost impossible to maintain this strategy for large communities, however. Thus we find that the condition for stability for large communities is continuous changes in their membership, allowing for the possibility that after some time practically all members are exchanged.

AKSOE 12.2　Wed 15:15　EW 203

Cultural route to the emergence of linguistic categories — Andrea Baronchelli[1], ●Vittorio Loreto[2,3], and Andrea Puglisi[2] — [1]Departament de Fisica i Enginyeria Nuclear, Universitat Politecnica de Catalunya, Campus Nord, Modul B4, 08034 Barcelona, Spain — [2]Dipartimento di Fisica, "Sapienza" Universita' di Roma, Piazzale Aldo Moro 2, 00185 Rome, Italy — [3]Complex Networks Lagrange Laboratory, ISI Foundation, Turin, Italy

Categories provide a coarse grained description of the world. A fundamental question is whether categories simply mirror an underlying structure of nature, or instead come from the complex interactions of human beings among themselves and with the environment. Here we address this question by modeling a population of individuals who co-evolve their own system of symbols and meanings by playing elementary language games. The central result is the emergence of a hierarchical category structure made of two distinct levels: a basic layer, responsible for fine discrimination of the environment, and a shared linguistic layer that groups together perceptions to guarantee communicative success. Remarkably, the number of linguistic categories turns out to be finite and small, as observed in natural languages.

AKSOE 12.3　Wed 15:45　EW 203

Collective Phenomena in Complex Social Systems — ●González-avella Juan Carlos, Vazquez Federico, Eguíluz Victor, and San Miguel Maxi — Instituto de Física Interdisciplinar y Sistemas Complejos (IFISC-CSIC), Palma de Mallorca, Spain

The problem of social consensus is approached from the perspective of nonlinear dynamics of interacting agents in a complex network.

Some basic concepts, such as dynamical metastability, are discussed in the framework of the prototype voter model. In the context of Axelrod's model for the dissemination of culture we describe a co-evolutionary dynamics formulation with recent results on group formation and nonequilibrium network fragmentation and recombination transitions.

AKSOE 12.4　Wed 16:15　EW 203

Investigation of opinion poll data and election results in Germany and Great Britain — ●Johannes Josef Schneider[1] and Christian Hirtreiter[2] — [1]Institute of Physics, Johannes Gutenberg University of Mainz, Staudinger Weg 7, 55099 Mainz, Germany — [2]Faculty of Chemistry, University of Regensburg, 93040 Regensburg, Germany

Since many years, the Allensbach institute in Germany and a related institute in Great Britain performs an opinion poll each week, asking at least 1000 people the question "Which party would you vote for if there was an election next Sunday?"

We investigate these opinion poll data by means of time series analysis. The most prominent results for the German data are fat tails in the return distributions of the time series. Furthermore, we find that the election results for the Green party cannot be predicted at all by opinion polls, for the conservative and the social democratic party, we find that the opinion poll data agree the more with the election results, the closer the date of the opinion poll is to the election date [1]. Thus, the question arises whether an opinion poll long before an election provides any useful information at all.

In this talk, we compare the results we found in Germany with corresponding data from Great Britain.

[1] J.J. Schneider and Ch. Hirtreiter, preprint, accepted for publication in Int. J. Mod. Phys. C, 2007.

AKSOE 12.5　Wed 16:45　EW 203

Some key properties of the German soccer league: a model-free time series analysis — ●Andreas Heuer and Oliver Rubner — Inst. f. Phys. Chemie, Corrensstr. 30, 48149 Münster

In recent years several complex models have been devoloped to characterize the outcome of sports leagues in the course of a season. The final interpretation usually depends strongly on model assumptions. In this work we analyse a large database of 40 years of results in the German soccer league (1. Bundesliga). Therefrom interesting questions can be answered without resorting to any models: (1) How do the team fitnesses change during a season and from season to season? Many models assume a random walk-type behavior of a team fitness during one season. (2) Are offensive or defensive abilities more relevant for a successful outcome? (3) Do series of wins or losses exist beyond statistical fluctuations? Answering the last question involves ideas, originating from multidimensional NMR experiments and gives rise to interesting psychological insight into professional soccer.