AKSOE 4: Poster Session (posters are expected to be displayed the full day (9:00-18:00)

Time: Monday 16:30–18:00 Location: Poster D

AKSOE 4.1 Mon 16:30 Poster D
Using Lower partial moments for optimization of portfolios —
•Uli Spreitzer and Vladimir reznik — Dr. Dr. Heissmann GmbH, 65189 Wiesbaden

We use the coherent measure of risk the so called lower partial moments to optimize a portfolio consisting of risky and non risky assets.

We compare with a portfolio optimization based on VaR or standard deviation as measure of risk.

We show results for several portfolios built from assets (DAX) and goverment bonds. Also we compare our results with several funds.

AKSOE 4.2 Mon 16:30 Poster D
Statistical properties of short term price trends — •Paweł Sieczka and Janusz Hołyst — Faculty of Physics and Center of Excellence for Complex Systems Research Warsaw University of Technology, Koszykowa 75, PL 00-662 Warsaw, Poland

We have investigated properties of short term price trends (starting from 10 sec.) at various stock markets. The results point out that there is a significant difference between real markets and the random walk model. This difference is due to price autocorrelations that influence a probability of trend extending. This probability depends in a specific way on a length of the current trend period. The results for different markets are compared.

AKSOE 4.3 Mon 16:30 Poster D
Implementation of ε-intelligence in the Bak asset market model — •Boris Brodda, Johannes Josef Schneider, and Wolfgang Paul — Institute of Physics, Johannes Gutenberg University of Mainz, Staudinger Weg 7, 55099 Mainz, Germany

In the Bak stock market model, which can be generalized also to other kinds of assets, several agents buy and sell assets at a virtual financial market. The agents randomly update their individual conceptions of the price for buying and selling an asset, respectively, influenced only by the current market price, a drift probability, and an imitative behavior [1].

However, the agents in this model do not inherit some complex behavior or exhibit complex strategies, as can be assumed of the traders at real financial markets. Therefore, in a first step, we assign some ε-intelligence to the agents, thus enabling them to perform their actions not entirely at random but with some low-level strategies.

[1] P. Bak, M. Paczuski, and M. Shubik, Physica A **246**, 430, 1997.

AKSOE 4.4 Mon 16:30 Poster D
Investigating community structure in social tagging systems — •Vito Servedio[1,2], Andrea Baldassarri[1], Ciro Cattuto[2,1], and Vittorio Loreto[1] — [1]La Sapienza University Physics Department, Roma, Italy — [2]Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi, Roma, Italy

A social classification paradigm known as "collaborative tagging" has been successfully deployed in popular web applications designed to manage and share diverse online media. Users of these systems organize resources by associating them with freely chosen text labels, or "tags". The adoption of collaborative tagging has recently surged: Millions of users are already involved, and as a result huge human-annotated databases are becoming available for the first time. We analyze data from one of the most paradigmatic tagging systems and focus on tags associated with a given resource. Based on the frequency distribution of tags provided by users, we introduce a notion of (socially emergent) similarity among resources. By using this notion of similarity we study the community structure of the ensuing network and show that communities correspond to semantically separated areas. We relate the semantic community structure to the underlying social network of users of the tagging system.

AKSOE 4.5 Mon 16:30 Poster D
Analysis of a multi-agent-based order book model describing a financial market — •Tobias Preis, Sebastian Golke, Wolfgang Paul, and Johannes Josef Schneider — Institute of Physics, Johannes Gutenberg University of Mainz, Staudinger Weg 7, 55099 Mainz, Germany

We recently introduced a realistic order book model [1] which is able to generate the stylized facts of financial markets. Now we analyze this model in detail, explain the consequences of the use of different groups of traders, and focus on the foundation of a nontrivial Hurst exponent based on the introduction of a market trend. Our order book model supports the theoretical hypothesis that a nontrivial Hurst exponent implies not necessarily long-term correlations. An additional coupling of the order placement depth to the market trend can produce fat tails, which can be described by a truncated Lévy distribution.

[1] T. Preis, S. Golke, W. Paul, and J. J. Schneider, *Multi-agent-based Order Book Model of financial markets*, Europhys. Lett. **75**, 510, 2006.

AKSOE 4.6 Mon 16:30 Poster D
Envy as a source of exchange in a multiagent system — Elena Ramirez and •Juan Guillermo Diaz Ochoa — Fachbereich 1, University of Bremen, Otto Hahn Allee, D-28359 Bremen

The use of statistical mechanics has changed the way in we understand, how the market dynamics is defined. The basic assumption is the existence of stochastic forces that govern a stock of exchanges. A first approach to this kind of systems is using its similitude with the concept of brownian motion. However, a market shows a critical behavior related with a kind of self organization. For example, the Donangelo-Sneppen model is a method which describes a market showing self organization by means of interaction rules defined by particular constrains for each individual.

However, real markets concern individuals that not only trade using a preference list but also try to increase their individual welfare. In such case, envy is an additional force that influences a network of trading agents. In this model we implement the dynamics of envious agents to the dynamics of trading agents in order to observe the effect of forced reallocations to achieve a welfare state.

AKSOE 4.7 Mon 16:30 Poster D
Car following model with dynamical traps — •Julia Hinkel[1], Ihor Lubashevsky[2], Reinhard Mahnke[1], and Christof Liebe[1] — [1]Universität Rostock, Institut für Physik, Germany — [2]Theory Department, A.M. Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia

The dynamics of car following is under consideration. By way of example, the rather simple model of the motion of two cars is studied and its dynamics is analysed numerically. The leading car has a constant speed. The following car is specified by the system of stochastic differential equations in phase space of the headway and velocity difference with additive white noise. The equation for acceleration includes the term which describes the delay in the driver reaction with perception depending on the velocity difference. The perception determines the dynamical trap region near the headway axis where the velocity difference becomes sufficiently low.

The present investigations show numerically that the additive white noise can cause several anomalies. A new type of noised induced phase transition in headway space is observed. The headway distribution can become bimodal and velocity distribution has the Laplace form under influence of dynamical trap effect.

AKSOE 4.8 Mon 16:30 Poster D
Networks of companies and branches in Poland — •Anna Chmiel, Julian Sienkiewicz, Krzysztof Suchecki, and Janusz Hołyst — Warsaw University of Technology, Faculty of Physics, Warsaw, Poland

Using a commercial data base we constructed a bipartite graph of companies and branches in Poland. The graph was transformed to create a companies network where a link means that two companies belong to at least one common trade and a link weight describes a number of common trades for a companies pair. Similarly a branches network was constructed where nodes are branches and edges represent connections if at least one company belongs to the same branch. Corresponding link weights describe numbers of companies that are active in the same pair of branches. We have observed that a weight distribution is a power law function in the branches network while the distribution shows an exponential behavior in a certain range in the companies networks. Using cutoffs of links weights we constructed networks with different filter levels and studied degree distributions for such networks. For a

properly chosen cutoff values the degree distribution in the companies network is described by a power law with a characteristic exponent close one. Two regions of scaling can be observed for the branches network above some cutoff level.

AKSOE 4.9   Mon 16:30   Poster D

Homophily, Cultural Drift and the Co-Evolution of Cultural Groups — •Juan Carlos Gonzalez Avella[1], Damon Centola[2], Victor Eguiluz[1], and Maxi San Miguel[1] — [1]IMEDEA (CSIC-UIB), Campus Universitat Illes Balears, E-07122 Palma de Mallorca, Spain. — [2]The Institute for Quantitative Social Science, Harvard University, Cambridge, MA 02138, USA

In studies of cultural differentiation, the joint mechanisms of homophily and influence have been able to explain how distinct cultural groups can form. While these mechanisms normally lead to cultural convergence, increased levels of heterogeneity can allow them to produce global diversity. However, this emergent cultural diversity has proven to be unstable in the face of "cultural drift"- small errors or innovations that allow cultures to change from within. We develop a model of cultural differentiation that combines the traditional mechanisms of homophily and influence with a third mechanism of "network homophily", in which network structure co-evolves with cultural interaction. We show that if social ties are allowed to change with cultural influence, a complex relationship between heterogeneity and cultural diversity is revealed, in which increased heterogeneity can reduce cultural group formation while simultaneously increasing social connectedness. Our results show that in certain regions of the parameter space these co-evolutionary dynamics can lead to patterns of cultural diversity that are stable in the presence of cultural drift.

AKSOE 4.10   Mon 16:30   Poster D

Dynamics of Spatial Networks with Application to Gas and Forest Industries — •Yuri Yegorov — Institute for Advanced Studies, Stumpergasse 56, A-1060, Vienna, Austria

For the industries that deal with products that have low price/weight ratio spatial structure is important, and space-less economic models can be misleading. Both exploitation of land-located natural resource and distribution of product across consumers have this property. Here a mathematical model is proposed for the growth of spatial networks. It can be equally applied for forest exploitation over large territory and for building gas distribution networks after construction of a pipeline. The use of forest in Russia is not sustainable. Large regions near country borders and ports have lost its forest, while large areas in Central Siberia are practically not exploited, due to high cost of access and underdevelopment of transport network After liberalization, transportation in Russia became relatively more expensive, and this changed the pattern of forest use. Economic forces drive this production to non-sustainability, and some government control is necessary. If the prices for wood exploitation would become prohibitively expensive when it is scarce (i.e. near the border) and transport subsidies would be given for remote regions, then wood production could grow without deforestation. When a strategic gas pipeline is constructed, gas supply infrastructure around it grows. Consumers shift from other energy to gas changing demand function. The model captures these spatial effects that modify demand function. Here spatial model allows for understanding how investment in supply can lead to demand growth.

AKSOE 4.11   Mon 16:30   Poster D

Analysis of opinion polls in Germany — •Christian Hirtreiter[1] and Johannes Josef 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

The influence of opinion polls has grown remarkably over the last few decades, both for daily life and for politics. Public opinion polls in Germany (so-called Sonntagsfrage: *for which party would you vote if there was an election next Sunday?*) are used as the main indicator for outcomes in real elections and for the acceptability of individual politicians and political parties. Although it is widely assumed that public opinion polls could reproduce election results, it turns out that the outcomes of weekly voter polls are not too reliable, due to some drawbacks in the poll system. We investigate the results of opinion polls by means of time series analysis and focus on the correlation between election and opinion poll results.