Berlin Center for Studies of Complex Chemical Systems e. V.

Fritz-Haber-Institut der Max-Planck-Gesellschaft, Humboldt-Universität, Max-Delbrück-Centrum für Molekulare Medizin, Otto-von-Guericke-Universität Magdeburg, Physikalisch-Technische Bundesanstalt, Technische Universität Berlin, Universität Potsdam

Seminar

Complex Nonlinear Processes in Chemistry and Biology

Honorary Chairman: **G. Ertl**

Organizers: **M. Bär, C. Beta, H. Engel, M. Falcke, M. J. B. Hauser, A. S. Mikhailov, P. Plath, L. Schimansky-Geier, H. Stark, J. Kurths**

Friday, 3rd February 2012, 16:00 s.t.

Prof. Dr. Dieter Armbruster

School of Mathematical and Statistical Sciences, Arizona State University

Netball - The network structure of NBA basketball

Abstract

We analyze the network properties of NBA basketball games. Defining players as nodes and ball movements as links we can characterize a ball game as samples of random networks. We have studied the playoff games of the 2009/2010 NBA series. Using network theoretical constructs we determine average properties for these networks and characterize the game, specific teams and specific players by their network properties. We show that there is a typical network structure for an NBA team. Most teams present networks that are close to this typical structure with the Los Angeles Lakers (low degree centrality) and the Milwaukee Bucks (high degree centrality) marking the extremes. We identify two different playing strategies corresponding to network flows with high entropy and to flows in networks that increase the shooting efficiency of the team, respectively. A particular notion of flow centrality allows us to determine the value of a player for the team, in contrast to the usual individualized statistics. The possibility to use such network analyses to study functional small team networks is discussed.

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