PHYSICAL MATHEMATICS SEMINAR

TOPIC: MEAN-FIELD AND ANOMALOUS BEHAVIOR
ON A SMALL-WORLD NETWORK

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ABSTRACT:

Recently, the study of systems on networks, general graphs with some combination of nodes and vertices, has become of great interest. Practical examples of these systems include the spread of epidemic disease over the network of human social contacts, the electric power grid, and the Internet.

These systems often combine both short- and long-range interactions. For example, transmission of disease typically occurs between people living close to each other geographically, but occasional long-range contact can occur due to air travel. I will consider a particular network that captures these long-range interactions: the small world network, which has become a standard model in the field. I will show that for a wide range of systems the behavior on this network can be described by a mean-field theory, and I will analyze the crossover to this behavior and discuss the implications of these results.

Finally, I will finish with the example of the Edwards-Wilkinson equation. Recent work of Toroczkai, Korniss, and others, has shown the relevance of this equation to synchronization in parallel processing. I will apply the results above to this example, and find that in some cases the mean-field behavior applies and in some cases it does not.

(Some of this is joint work with B. Kozma and G. Korniss.)

DATE: TUESDAY, FEBRUARY 24, 2004

TIME: 2:30 PM

LOCATION: Building 2, Room 338

Refreshments at 3:30 PM in Room 2-349.

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