MATEMATISKA INSTITUTIONEN
STOCKHOLMS UNIVERSITET
Avd. Matematik

SJÄLVSTÄNDIGT ARBETE I MATEMATIK

Tisdagen den 20 november kl. 10.00–11.00 presenterar Gabriela Malenová sitt arbete "Spectra of Quantum Graphs" (30 högskolepoäng, avancerad nivå).

Handledare: Pavel Kurasov

Plats: Sal 21, hus 5, Kräftriket

Abstract: Quantum graph is a network structure determined by:

1. a metric graph consisting of sets of edges and vertices,
2. a di erential operator acting on the edges,
3. matching and boundary conditions on internal and external vertices respectively.

Since the spectra of quantum graphs can be calculated analytically in a few special cases only, numerical methods have to be employed. Spectral methods based on Galerkin tau-methods appear to be the most convenient for that purpose. The code in Matlab environment has been evolved for computing eigenvalues of the graph. Employing numerics, we obtain extensive computational data that may be helpful for understanding fine spectral properties of quantum graphs. In particular, the spectral gap, i.e. the second eigenvalue of the Laplacian, has been closely investigated. In spite it bears some similar characteristics to discrete graphs we show that unlike in the discrete case, cutting o an edge does not necessarily mean the second eigenvalue increases. Another important result says that a string has always the lowest spectral gap among all graphs of the same total length.

Alla intresserade är välkomna!