

MATEMATISKA INSTITUTIONEN  
STOCKHOLMS UNIVERSITET  
Avd. Matematik

## SJÄLVSTÄNDIGT ARBETE I MATEMATIK

Onsdagen den 10 september kl. 14.30 - 15.30 presenterar Isak Trygg Kupersmidt sitt arbete "On the ground state of quantum graphs:  $\delta$ -conditions and potentials" (30 högskolepoäng, avancerad nivå).

Handledare: Pavel Kurasov

Plats: Sal 32, hus 5, Kräftriket

Sammanfattning: Quantum graphs consists of differential operators acting on metric graphs with matching conditions at its vertices. One of their main properties that are studied is their eigenvalues which can be described by their quadratic form. Using the quadratic form, quantum graphs with  $\delta$ -interaction at its vertices are investigated. By looking at how changes in the metric graph and the matching conditions affect the quadratic form a number of useful tools for analysing the ground state energy are formulated. They are then used to show a sharp lower bound on the ground state energy for the Laplace operator on such graphs, and to find the graph with the lowest ground state energy. Similar methods are then used to find a non-sharp upper bound. The results are then generalized from the Laplacian to the Shrödinger operator with standard conditions, where the upper bound turn out to be part of a more general theorem.

Alla intresserade är välkomna!