Abstract:
The exponential growth rate $h$ (with respect to the natural logarithm) of the number of configurations on $\mathbb{Z}^d$ with respect to a given subshift of finite type arises in the theory of various physical phenomena. In physics $e^h$ is viewed as the entropy (per atom) of the corresponding hard model, in mathematics $h$ is called the topological entropy, and in information theory $h$ (with respect to $\log_2$) is called the multi-dimensional capacity. In the one-dimensional case ($d = 1$) $e^h$ is the spectral radius $\rho(A)$ of the corresponding transfer matrix. There are very few 2-dimensional models where the value of $h$ is known in closed form. In all other cases there are estimates based on (a) asymptotic expansions; (b) Monte-Carlo methods; (c) bounds.

In this talk we give the complete up-to-date theory for computing $h$ by lower and upper bounds. It refines the techniques described in [Friedland, Proc. MTNS 2002] by using an automorphism subgroup of a certain graph. As a demonstration of these techniques, we compute the topological entropy of the monomer-dimer system in a plan grid with 8-digit precision. We compare our results to the known results.

Friday, May 9, 2003
3:00 PM in 372 Jabara Hall

Please come join us for refreshments before the lecture
at 2:30 p.m. in room 353 Jabara Hall.