



PURDUE UNIVERSITY

Department of Mathematics Colloquium

Speaker: Professor Karl Hadeler, Arizona State University
Title: "Monotonicity Properties of Eigenvalues in Dynamical Systems and Compartment Models"
Date: Tuesday, March 27, 2007
Time: 4:30 P.M.
Place: MATH 175

Abstract

The basic reproduction number is a normalized bifurcation parameter (Perron root of the next-generation operator) which plays a crucial role in the mathematical discussion of epidemic model systems. It may depend in a complicated way on the parameters of the system, and it may be difficult to prove that it depends in a monotone way on such parameters, in particular when these parameters are functions rather than numbers. A typical example with infectivity depending on time since infection is presented together with a theorem on transitions in compartment chains, which yields the desired solution as a special case.

Then a somewhat simpler, but far more general problem is presented on quasi-positive matrices depending on transition rates in such a way that some entries increase, others decrease with the rate. The problem is to determine the possibly monotone dependence of the (Perron) spectral bound on the rate.

Refreshments will be served in the Math Library Lounge, 4:00 P.M.