Course: APM598 Introduction to Delay Differential Equations with Applications to the Life Sciences

Location: Wexler A307
line #:85320
T & Th 3:00-4:15
Text: An Introduction to Delay Differential Equations with Applications to the Life Sciences, H. Smith
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Office Hours: TBD or by appt.

Delay differential equations are widely used as mathematical models in many fields, spanning engineering, physics, and especially the life sciences. In a delay differential equation, rates of change of state variables can depend on past values as well as present values of state variables. The basic theory for these equations runs parallel to that for ordinary differential equations with one key distinction: the state space is infinite dimensional. I will assume that students have a good background in ordinary differential equations (e.g. MAT475 or APM501). This will allow us to minimize proofs of standard theorems that are quite similar to their ordinary differential equation counterpart and instead to concentrate on the applications. The course will develop the standard tools used by applied mathematicians to analyze the qualitative behavior of solutions and it will introduce students to modeling using delay differential equations, especially in the life sciences.

Students will also become comfortable with computer simulations using MATLAB.

Students will submit a written project and give a short presentation of it to the class. Guidelines for acceptable projects will be provided on this Blackboard site. It is especially important that students keep me informed periodically on their progress so that I may make suggestions. A second option is to write solutions of selected (approved by me) homework problems from the text.

The text is on (3-day) reserve at Noble library.