

SSM Talks, Fall 2003

Sept. 10 *Proving Fermat's Little Theorem with Dynamical Systems*

Parisa Babaali

In this talk we will prove an important result, Fermat's Little Theorem, which says for a prime number p , if a is any integer, we have $p|a^p - a$. Although the theorem is a number theory result I will prove it using techniques from dynamical systems. Most of the proof is geometric, as is common in dynamical systems, rather than algebraic as in number theory.

Sept. 17 *How Many Shuffles Does It Take to Make a Deck of Cards 'Shuffled?'*

Nathan Kahl

In the 1990's the New York Times ran an article giving an answer to the problem mentioned in the talk title. (Seven shuffles suffice.) I'll explain how mathematicians modelled the problem and came up with the number given.

Sept. 24 *A Generalization of the Laplace Transform*

Ray Maleh

I'm going to present a method of generalizing the Laplace transform in order to simplify certain differential equations with functional coefficients. Then I will derive a generalized expression for convolution in the spatial-domain and present a linear functional that behaves like an identity with respect to this convolution operation. I'll also discuss the problem of finding an inverse for this transform.

Oct. 22 *Stochastic Optimization Models*

Darinka Dentcheva

The talk will introduce the audience to the basic models and questions which are investigated in stochastic optimization. These models arise when optimization problems with random data have to be considered. We will discuss several approaches to reflect uncertainty and risk. Some basic ideas for the numerical solution of the problems will be presented.