

MATHEMATICS DEPARTMENT
North Carolina State University

DIFFERENTIAL EQUATIONS SEMINAR

Wednesday, February 23, 2005
2:35 p.m. 330 Harrelson Hall

Moody Chu

Department of Mathematics, NCSU

Group Actions, Linear Transformations, and Flows: Dynamical Systems on Manifolds

It is known that there is a close relationship between matrix groups and linear transformations. The purpose of this exposition is to explore that relationship and to bridge it to the area of applied linear algebra. Some known connections between discrete algorithms and differential systems will be used to motivate a larger framework that allows embracing more general matrix groups. Different types of group actions will also be considered. The inherited topological structure of the Lie groups makes it possible to design various flows to approximate or to effect desired canonical forms of linear transformations. While the group action on a fixed matrix usually preserves a certain internal properties or structures along the orbit, the action alone often is not sufficient to drive the orbit home to the desired canonical form. Various means to further control these actions will be introduced. These controlled group actions on linear transformations often can be characterized by a certain dynamical systems on a certain matrix manifolds. Wide range of applications starting from eigenvalue computation to structured low rank approximation, and to some inverse problems are demonstrated. A number of open problems will be identified.

Graduate students are invited to attend.

For questions, comments, and offers to talk, contact Kris Jenssen, hkjensse@math.ncsu.edu.
Please visit the DE Seminar web page at www.math.ncsu.edu/seminars.html.