Linear Algebra

Course contents: Vector spaces; linear transformations and matrices; determinants; systems of linear equations and Gaussian elimination; eigenvalues, eigenvectors and diagonalization; generalized eigenvectors and Jordan decomposition; minimal polynomials, Cayley-Hamilton theorem; norms and inner products, orthogonality.

Text: A set of class notes (evolved from courses taught by I. Knowles, G. Stolz, N. Chernov and R. Weikard) will be provided. These notes contain all definitions, theorems, and examples, but no proofs (which will be presented in detail in class). No textbook is strictly required. A textbook recommended: “Linear Algebra Done Right” by Sheldon Axler (any edition).

Necessary background: Familiarity with undergraduate linear algebra: systems of linear equations, Gaussian elimination, matrices and determinants. All necessary concepts will be (briefly) re-introduced, but some prior training is useful. If needed, I can help with finding undergraduate textbooks with more details on this.

Grading policy: Weekly homework (60%), Final exam (40%).

The final exam is scheduled for Tuesday, December 12, 1:30 pm – 4:00 pm.

Homework: Homework will be assigned on each Tuesday/Thursday and will be due on the following Tuesday. Approximately 90 percent of all homework problems should be completely done to receive an A, 70 percent for a B, and 40 percent for a C.

Preparation for Joint Program Exam: This course covers the material for the theoretical part of the Joint Program Exam in Applied Linear Algebra. Past exams can be downloaded at

http://www.math.uab.edu/department/jp_exams.html

Problems from past exams will also be used in homework assignments.