

Final Projects

My suggestion for a final project is a complete analysis of a specific type of matrix in terms of the theory developed throughout the semester. Among the classes of matrices you may choose to examine are Hadamard, Hankel, Hilbert, Magic, Toeplitz, and Vandermonde, as well as any other type of matrix that may be of particular interest to you. Your paper should include a discussion of fundamental subspaces and matrix factorizations ($A = LDU$, $A = QR$, $A = SDS^{-1}$) already emphasized or to be emphasized in class. Also, your report should discuss at least one specific application of the class of matrices in detail. I encourage you to use available software, such as Matlab, to explore parts of this project.

The following is a guideline for your final project, if you choose to do one instead of taking the final. The projects should be at least 8-10 pages of written material (not including graphs) *per person*, and can be done in groups.

1. Introduction

You should describe the matrices that you are studying in detail. If the matrix model comes from an application in the sciences, you should include a derivation from basic principles. In all cases, you should discuss the significance of your study.

2. Calculations

You should analyze your matrix using all relevant techniques presented in class.

3. Computations

If applicable, you should describe how to use available software packages to verify your analysis.

4. Discussion

You should summarize your results and discuss future directions for your project.

5. Bibliography

You should have a bibliography with at least five references.

You should submit an outline during the first week of April.