Linear Algebra Report Due: Some Date
Subject: Linear Algebra and Graph Theory

Description: The purpose of this report is to explore the connections between linear algebra and graph theory, primarily in the form of applications of linear algebra concepts to graph theory, and to report on your findings. Your primary source is the textbook, which has numerous applications of linear algebra concepts to graph theory (see, e.g., pages 11, 93-97, 180, 273, 329) Some other references are given below; also feel free to consult any other references that you find. The goal of your report is to find and explain applications of as many linear algebra/matrix theory concepts as possible, and illustrate such applications with example(s) and calculations. Nearly every chapter of the text has some application to graph theory with the exception of Chapter 5 (the eigenvalue problem.) It would be very nice if you could track down a graph-theoretic application of this subject as well.

Guidelines: This project is a group project which is based on material found in the the textbook and other sources. Any other sources used must receive attribution in the report and be listed in its bibliography. Any outside help (other than the instructor) should likewise be acknowledged.

The project is to be carried out with teams of one or two individuals. If you prefer to work alone on the project or choose your own partner, this is fine. Otherwise, I will assign partners for the project. It is expected that each partner will make a significant contribution to the project; this is a prerequisite for receiving full credit. The report will consist of two parts: a written report and a Maple notebook. The report you turn in should be a mix of equations, formulas, graphics and prose. If you want a page count guideline, the written project by a single student should be at minimum three pages, and for a team of two, a minimum of five pages. (Just including the necessary background definitions, etc., will get you close to the minimum, so these numbers should be no problem.) There is no upper bound, but you are cautioned against turning in endless tables of numbers or listings. A high quality short report is much better than a mediocre long report. See page 61 of the text for some advice on project writing. The report will involve some calculations in your Maple notebook, but these need not be at the level of writing programs. You will find some helpful information in the notebook LinAlgMaple5.ms which you download by clicking on the Maple URL in the resources section of our home page. You can consult with me at any stage of your project for help or suggestions. I won't pre-grade your project, but I will look at your work and try to give you guidance.

References

[1] Algebraic Graph Theory, Norman Biggs, Cambridge University Press, 1974.

[2] Graph Theory, B. Bollobas, Springer-Verlag, 1979.

[3] Introduction to Graph Theory, 4th ed., Robin Wilson, Longman Group Ltd (1996).