

CPS 5401 Fall 2012  
Shirley Moore, Instructor  
Project 2  
Iterative Methods for Sparse Linear Systems  
Due Dec 6, 2012

1. Select four large sparse test matrices from Matrix Market. Please be sure the matrices illustrate/explore different numerical properties of methods, for example symmetric positive definite vs. nonsymmetric, different convergence rates. It would be best to select from a variety of applications.
2. Generate right hand sides (e.g., ones vector) and solve each system using methods of your choice. You may use Matlab, a solver library, or your own implementation.
3. Report on your solution methods and numerical findings by writing a report with the following components:
  - a. Abstract/executive summary
  - b. High-level descriptions of the algorithms used in pseudo-code (You may borrow heavily from lectures notes or other sources, as long as you cite your sources).
  - c. Discuss implementation details, such as how to access the matrix, stopping criterion, and accuracy assessment.
  - d. References
  - e. Appendix: your code
4. Give a brief presentation to the class on one of your matrices and your solution method for that matrix. You may use PowerPoint or write on the board.

References:

Templates for the Solution of Linear Systems: Building Blocks for Iterative Methods  
[http://www.netlib.org/linalg/html\\_templates/Templates.html](http://www.netlib.org/linalg/html_templates/Templates.html)

Matrix Market  
<http://math.nist.gov/MatrixMarket/>