Numerical Computing :: Project Four

I've posted five different matrices as comma-separated text files. For each matrix, first load the matrix into memory. Then answer the following questions for each matrix:

1. What are the matrix dimensions?
2. How many nonzeros are there?
3. Is it symmetric?
4. Is it diagonal?
5. Is it orthogonal?
6. What is the rank?
7. What is the smallest singular value?
8. What is the largest singular value?
9. What is the condition number?
10. Generate five random right-hand-sides. For each right-hand-side b, try to solve $Ax = b$ with the appropriate solver (like `linsolve`). Did the solver have any issues solving the systems?

For each matrix, make two plots:

1. Plot the nonzero elements of the matrix.
2. Plot the magnitude of the elements of the matrix.

If you don't like the matrices I've posted, use your own from your work. Here are three great places to find interesting matrices:

- Tim Davis's SuiteSparse Matrix Collection
- NIST Matrix Market
- Matlab's `gallery`

If you use these, tell me why you think the matrix is interesting.