MATH 280-01 (122)
MATLAB Assignment 1

The MATLAB command RAND(N) generates an N-by-N matrix with random entries, chosen from a uniform distribution on the interval (0.0,1.0).
The command S = SUM(X) is the sum of the elements of the vector X. If X is a matrix, S is a row vector with the sum over each column.
The command ONES(M,N) or ONES([M,N]) is an M-by-N matrix of ones.
We can use the following commands to measure the elapsed time for each computation:
TIC Start a stopwatch timer.
TOC Read the stopwatch timer.

Set $n = 200$ and generate the following matrices by setting

$$\begin{aligned} A &= floor(10 * rand(n)); \\ b &= sum(A')'; \\ z &= ones(n, 1); \end{aligned}$$

note that the matrices are large so use semicolons to suppress the printout.

Q1. Explain Why the exact solution of the system $Ax = b$ should be z .

Q2. Use MATLAB to compare the solution computed by the "\" operation and by using A^{-1}. First measure the elapsed time for each computation by

$$tic,\ x = A\backslash b;\ toc$$
$$tic,\ y = inv(A) * b;\ toc$$

Which method is faster?

Q3. To compare the accuracy do this commands

$$max(abs(x - z))$$
$$max(abs(y - z))$$

Which method produces the most accurate solution?