MA227 (Assignment-5)

1. Write a function *JacobiIterSelf.m* that takes an invertible matrix A, a vector b, a convergence tolerance tol, and a maximum number of iterations $maxiter$. The function returns approximate solution to the equation $Ax = b$ by using Jacobi iterative solver. The function should be robust enough to accept dense systems of any moderate size. Run the iteration until $\frac{||x^{k+1}-x^k||_\infty}{||x^k||_\infty} < tol$, and only iterate at most $maxiter$ times. Take default value of $tol = 10^{-8}$ and $maxiter = 150$. Also keep track the residual error $||Ax^k - b||_\infty$ and plot this error against iteration count. Also print a table in the following format

$Iter$	x_1^k	$\cdot$	x_n^k
x^0			
$\cdot$			
x^k			

2. Repeat the above question for Gauss-Seidel and save your function with name *GSIterSelf.m*.

3. Test the above functions for $A = \begin{bmatrix} 6 & 1 & 1 & 1 & 1 \\ 1 & 7 & 1 & 1 & 1 \\ 1 & 1 & 8 & 1 & 1 \\ 1 & 1 & 1 & 9 & 1 \\ 1 & 1 & 1 & 1 & 10 \end{bmatrix}$ and $b = \begin{bmatrix} -10 \\ -6 \\ 0 \\ 8 \\ 18 \end{bmatrix}$. The exact solution is $x = \begin{bmatrix} -1 \\ -2 \\ 0 \\ 1 \\ 2 \end{bmatrix}$.