Table of Contents

AMSC 460 - HW8

```
clear all; format compact; close all; syms f(x) x y
```

Problem 1 (finished)

Rearrange the following equations to form a strictly diagonally dominant system. Apply two steps of Jacobi and Gauss-Seidel methods starting with the zero vector.

The rearranged diagonally dominant system is

```
syms u v
[1 3; 5 4] * [u;v] == [-1 ; 6]
```

```
ans =
 u + 3*v == -1
5*u + 4*v == 6
```

solving for u and v u = (6-4v)/5, v= (-1-u)/3

Using Jacobi method: [u0 ; v0] = [0 ; 0] So [u1; v1] = [6/5; -1/3]

[u2 ;v2] = [22/15; -11/15]

Gauss-Seidel Method: [u0 ; v0] = [0 ; 0] So [u1; v1] = [6/5; (-1-6/5)/3] = [6/5; -11/15]

[u2 ;v2] = [(6-(-44/15))/5 ; (-1-(134/75))/3] = [134/75; -209/225]

Problem 2 (Yup)

Ax = b using Jacobi method, (D+R)x= b So , Dx = b-Rx, and x = D^-1(b-RX) Therefore x_n=1 = D^-1(b-RXn)

The Jacobi method for x_n+1 = D^-1(b-Rxxn)

x_1^(k+1) = (bi -a12*x^k-a13*x3^k)/a11

x_2^(k+1) = (bi+2 -a21*x^k-a23*x3^k)/a22

x_3^(k+1) = (bi+2 -a31*x^k-a33*x3^k)/a33

x_n^(k+1) = (bi+n -an1*x^k-an3*x3^k)/ann

Therefore the Jacobi method is given for matrix A

Published with MATLAB® R2020b