ELEC 4700 Assignment-2 Finite Difference Method

Due: Sunday, Feb. 24, 2019 11:59PM By: Narrthanan Seevananthan

```
clear;

%V = Vo @ x = 0
%V = 0 @ x = L
L = 3;      %Length of the rectangular region
W = 2;
Vo = 1;      %Initial voltage

%mesh density and mesh points
dx = 0.05;
dy = 0.05;
nx = L/dx;
ny = W/dy;

VXY = -2*(1/(dx^2) + 1/(dy^2));
VX = 1/(dx^2);
VY = 1/(dy^2);

G = zeros(nx*ny,nx*ny);
B = zeros(nx*ny,1);

%x = i
%y = j
for x = 1:nx
    for y = 1:ny
        n = y + (x-1)*ny;

        if x == 1 || x == nx
            G(n,:) = Vo;
            B(n) = 1;

        elseif y == 1 || y == ny
            G(n,:) = 0;


        else
            nxp = y + (x-2)*ny;       %previous x value
            nxn = y + x*ny;           %next x value
            nyp = y-1 + (x-1)*ny;     %previous y value
            nyn = y+1 + (x-1)*ny;     %next y value

            G(n,n) = -VXY;
            G(n,nxp) = VX;
            G(n,nxn) = VX;
            G(n,nyp) = VY;
            G(n,nyn) = VY;
        end

    end
end
```

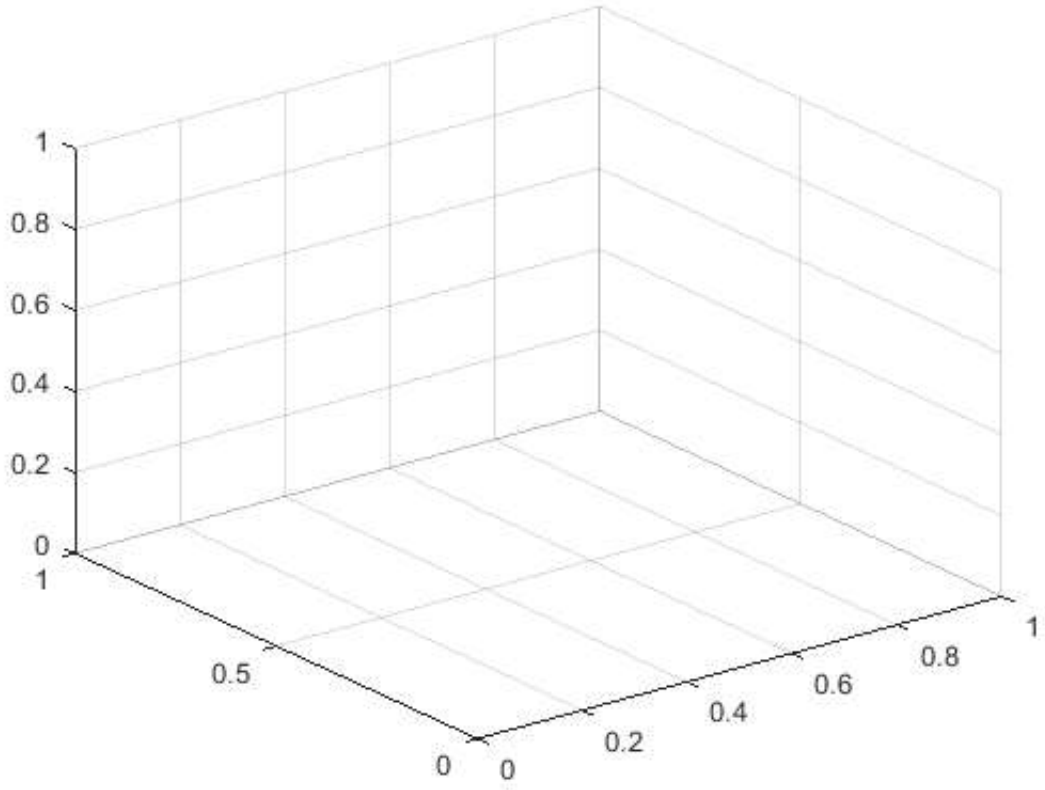
```
V = G\B;

V = reshape(V,[ny,nx]);

figure('Name','Visualize sparsity pattern');
%spy(G)

surf(V)
```

```
Warning: Matrix is singular to working precision.
```



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