

Example - Concrete Slab

```
close all; clear all
```

```
%Define vertex coordinates
```

```
Vertices=[0, 0; 8, 0; 8, 5; 0, 5];
```

```
%Define segments
```

```
Segments=[ 1, 2; 2, 3; 3, 4; 4, 1];
```

```
%Define surfaces
```

```
Surfaces=[1 2 3 4];
```

```
%Define number of elements per segments
```

```
Seed=[8 6 8 6 ]*2;
```

```
%Define number of element nodes and dofs per node
```

```
nen=4;
```

```
dofsPerNode=3;
```

```
Segp=[Seed];
```

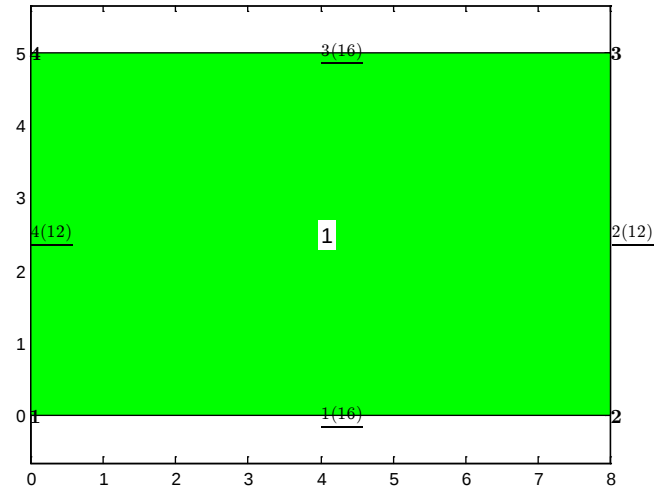
```
mp=[dofsPerNode, nen];
```

```
%Draw geometry
```

```
geomdraw2(Vertices,Segments,Surfaces,Segp,mp)
```

```
%Generate element mesh
```

```
[Coord Edof Dof meshdb]=strMeshgen(Vertices,Segments,Surfaces,Segp,mp);
```



Example - Concrete Slab

%Generate element coordinates

```
[Ex,Ey]=coordxtr(Edof,Coord,Dof,nen);
```

%Draw element mesh with numbering of the elements

```
eldraw2(Ex,Ey,[1 4 1],Edof(:,1));
```

%Draw element mesh with numbering of the 1 in each node

```
eldraw2(Ex,Ey,[1 4 0]);
```

```
text(Coord(:,1),Coord(:,2),num2str(Dof(:,1)))
```

%Prescribed displacements

```
bc1=extrSeg([1 2 3],meshdb,1);
```

```
bc2=extrSeg([1],meshdb,2);
```

```
bc=[bc1, 0*ones(length(bc1),1); bc2, 0*ones(length(bc2),1)];
```

%Element and material properties and load

```
ep=[0.15];
```

```
eq=[0.91*(-4.9e3*1.2-2e3*1.5)];
```

```
pctype=1;
```

```
E=30e9;
```

```
v=0.2;
```

```
D=hooke(pctype,E,v);
```

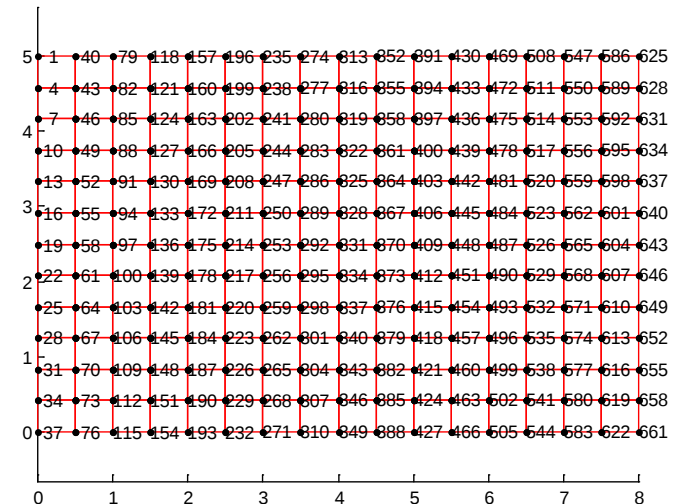
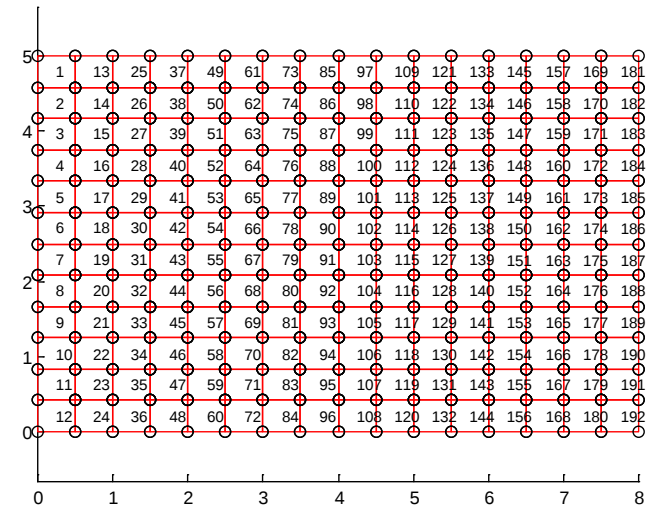
```
nel=size(Edof,1);
```

```
ndof=max(Edof(:));
```

%

```
K=sparse(ndof,ndof);
```

```
f=sparse(ndof,1);
```



Example - Concrete Slab

%Calculating element stiffness matrices and assembling to global stiffness matrix

```
for i=1:nel  
    [Ke,fe]=platre(Ex(i,:),Ey(i,:),ep,D,eq);  
    [K,f]=sparse_assem(Edof(i,:),K,Ke,f,fe);  
end
```

%Solving equation system

```
[a,r]=solveq(K,f,bc);  
Ed=extract(Edof,a);
```

%Calculating element moment and shear forces and curvature

```
Es=[]; Et=[];  
for j=1:nel  
    [Es(j,:),Et(j,:)]=platrs(Ex(j,:),Ey(j,:),ep,D,Ed(j,:));  
end
```

%Draw the displacements

```
figure(4)  
fill3(Ex',Ey',Ed(:,1:3:12)',Ed(:,1:3:12)')  
grid on
```

