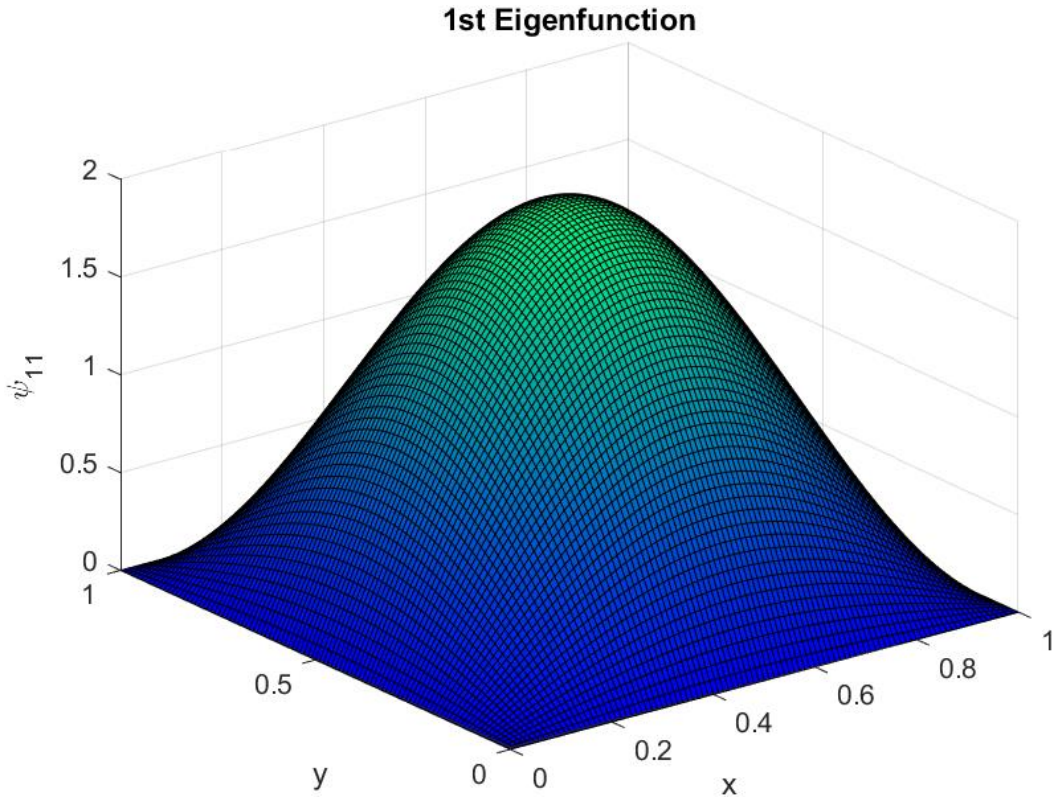
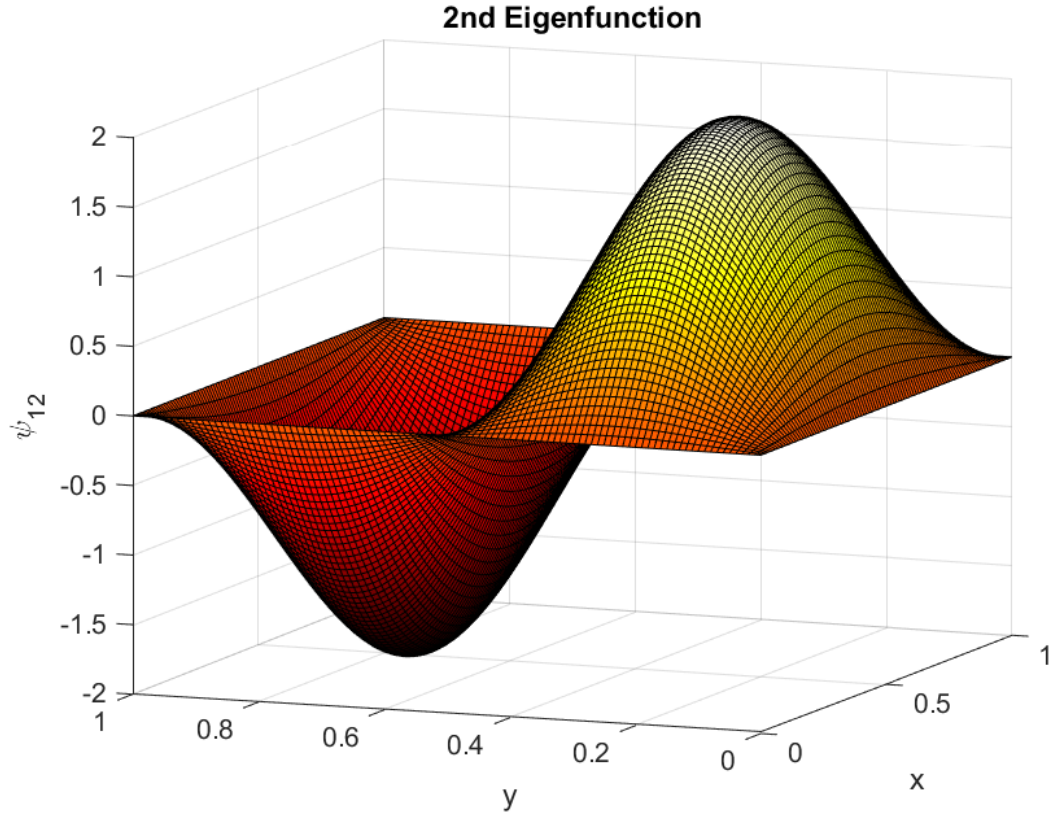
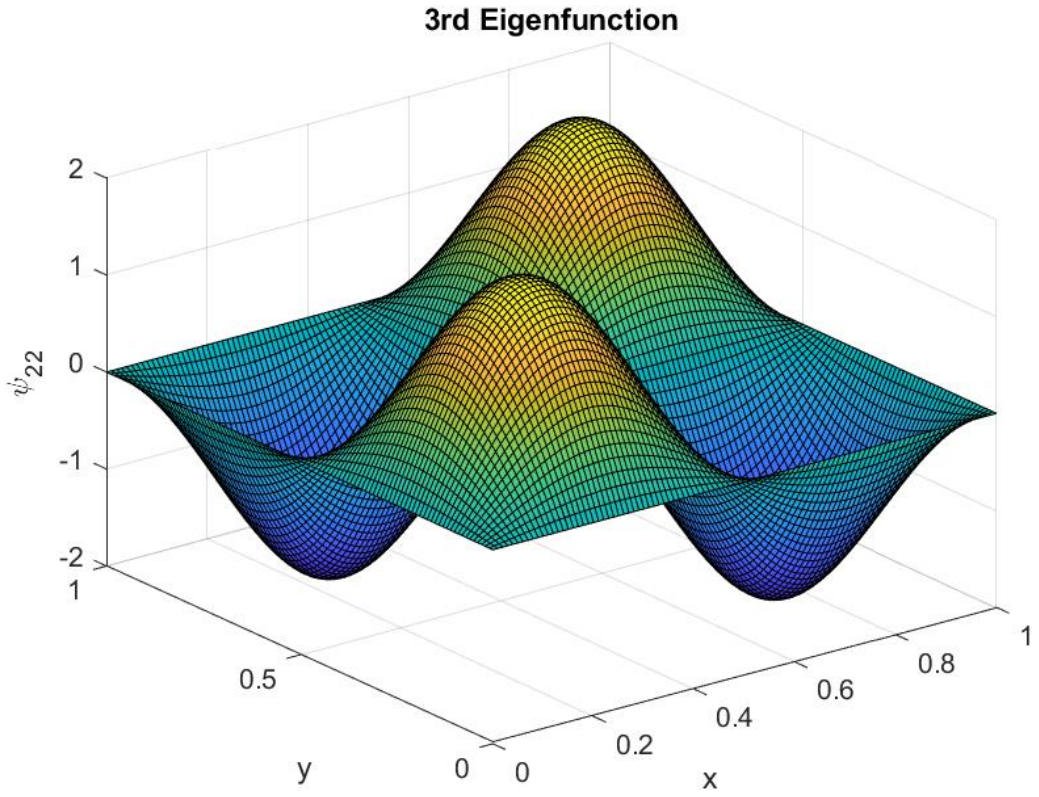

1st Eigenfunction
ψ_{11}
2
1.5
1
0.5
0
1
0.5
y
0
0
0.2
0.4
0.6
0.8
1
x


2nd Eigenfunction
ψ_{12}
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
1
0.8
0.6
0.4
0.2
0
y
0
0.5
1
x


3rd Eigenfunction
ψ_{22}
2
1
0
-1
-2
1
0.5
0
y
0
0.2
0.4
0.6
0.8
1
x

MATLAB CODE FOR PART 1

```
%parameters
a = 1.0; % length of the box

[x,y] = meshgrid(0:0.01:1,0:0.01:1);

psi_11 = (2/a).*(sin(1.*pi.*x/a)).*(sin(1.*pi.*y/a));
%first eigenfunction
psi_12 = (2/a).*(sin(1.*pi.*x/a)).*(sin(2.*pi.*y/a));
%second eigenfunction
psi_22 = (2/a).*(sin(2.*pi.*x/a)).*(sin(2.*pi.*y/a));
%third eigenfunction

figure
z1 = surf(x,y,psi_11);
colormap(winter);
title("1st Eigenfunction");
xlabel("x"),ylabel("y"),zlabel("\psi_1_1");

figure
z2 = surf(x,y,psi_12);
colormap(hot);
title("2nd Eigenfunction");
xlabel("x"),ylabel("y"),zlabel("\psi_1_2");

figure
z3 = surf(x,y,psi_22);
colormap(parula);
title("3rd Eigenfunction");
xlabel("x"),ylabel("y"),zlabel("\psi_2_2");
```