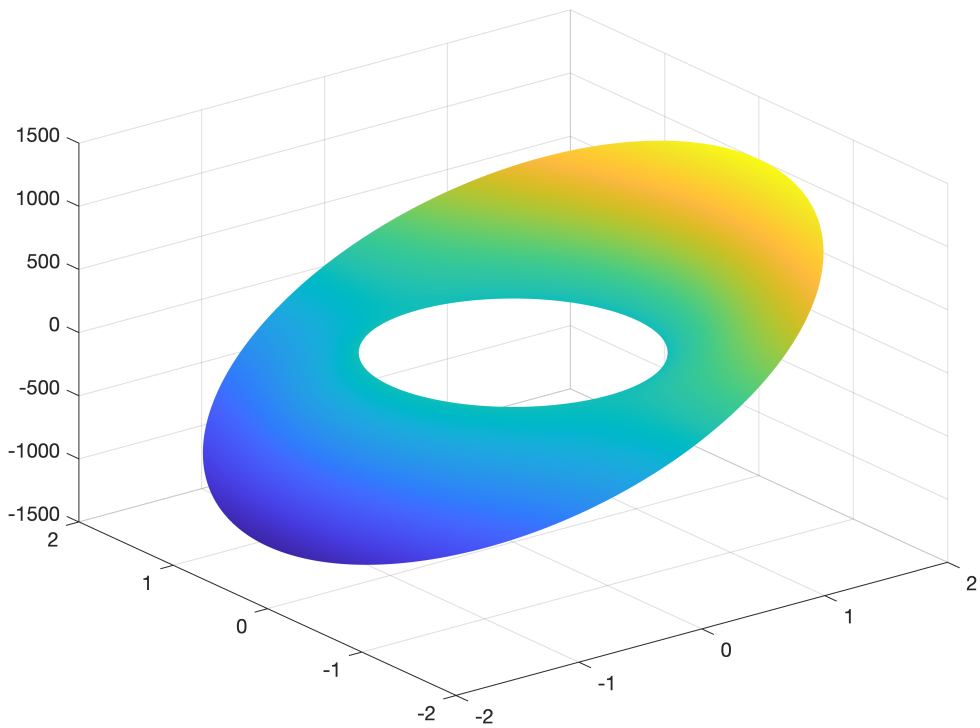
```
clear all
```

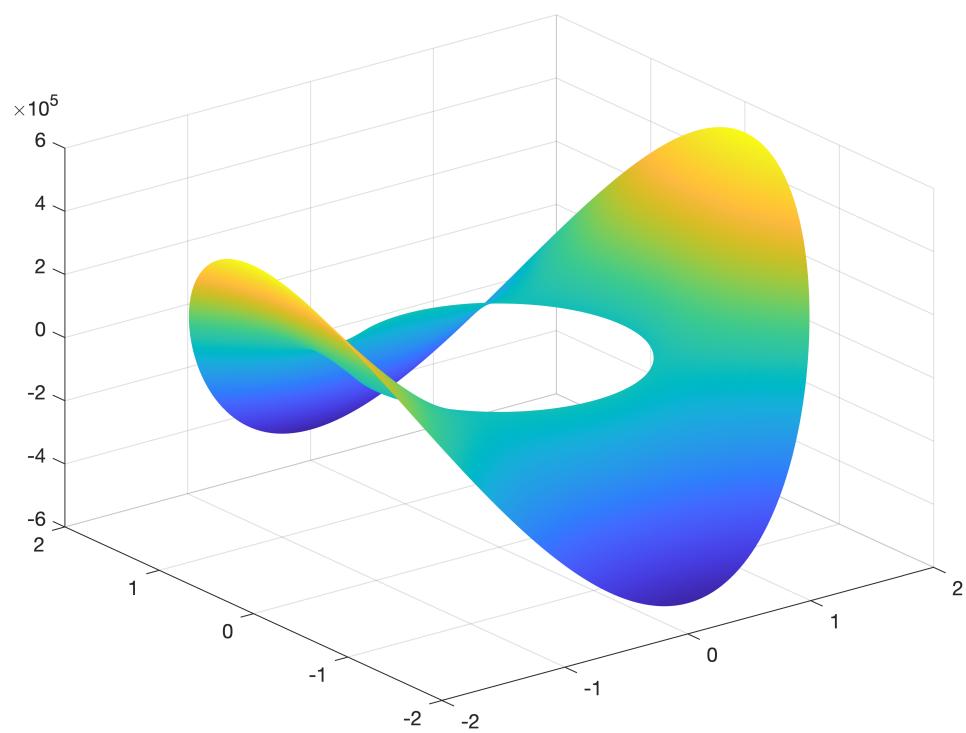
initialize paramters

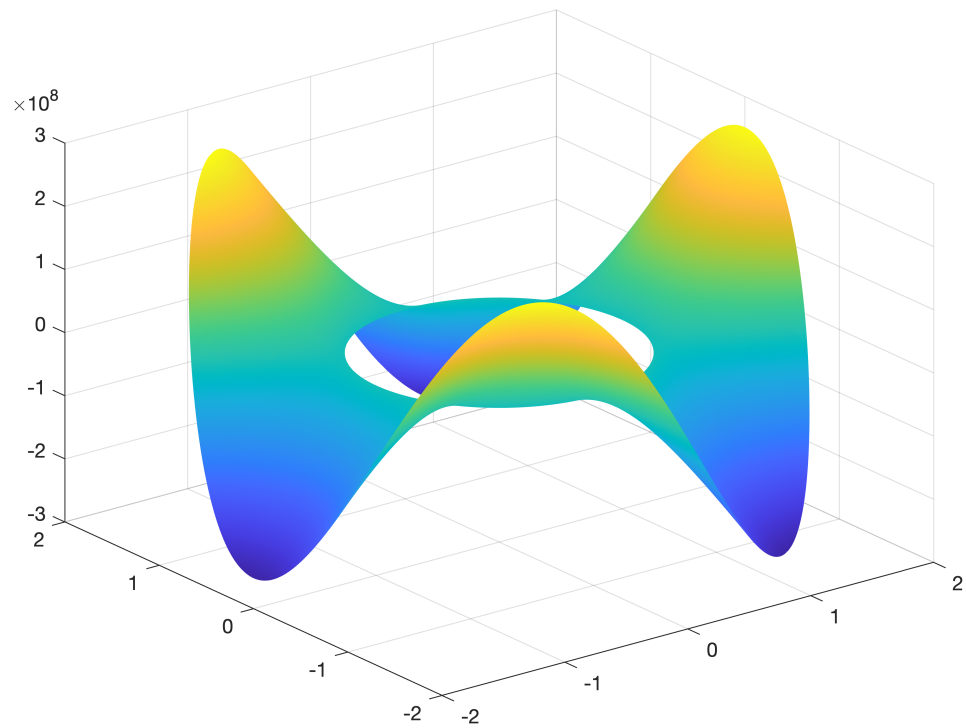
```
% number of modes
m = [1:10];
% inner radius
r1 = 1;
% outer radius
r2 = 2;
% discretization
n = 1000;
% steps
dr = (r2-r1)/n;
dtheta = 2*pi/n;
%variable vectors
theta = 0:dtheta:2*pi;
radius = r1:dr:r2;
% initializing solution u vector
u = zeros(n+1);
```

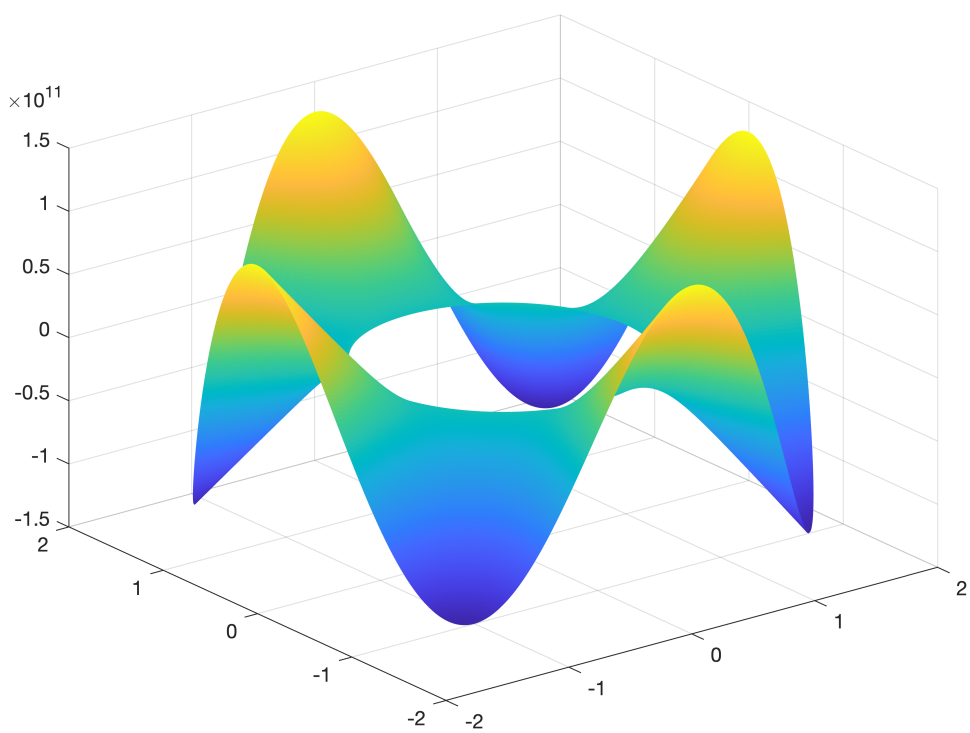
solving for solution u

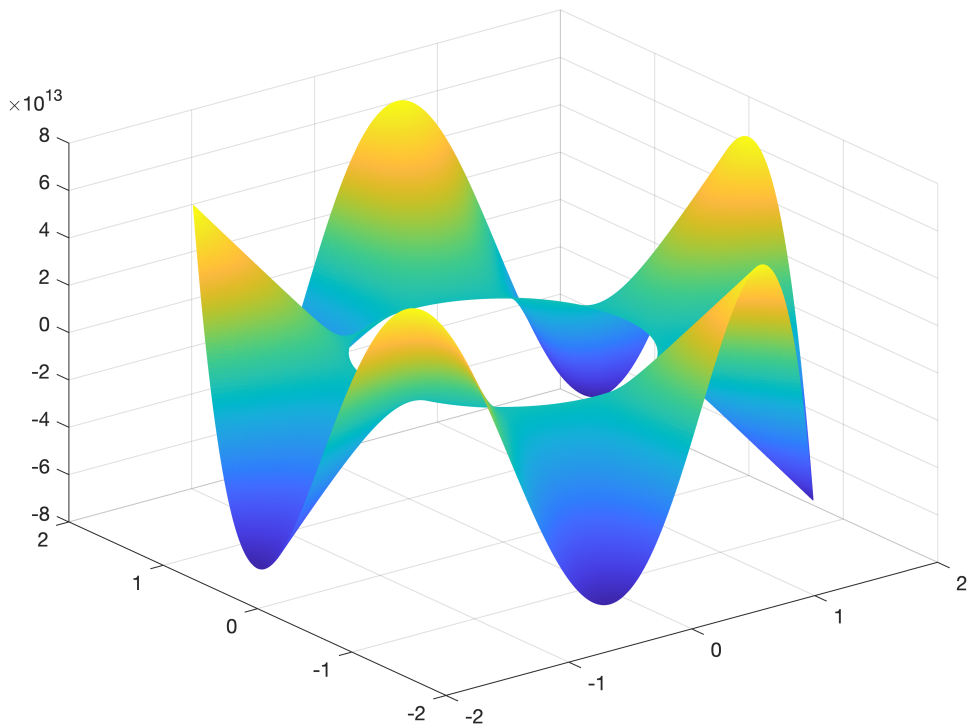
```
for l=1:length(m)
    figure
    [t,r] = meshgrid(theta,radius);
    u = (((r-r1)/(r2-r1))^m(l))*cos(m(l)*t);
    [x,y] = pol2cart(t,r);
    mesh(x,y,u)
```

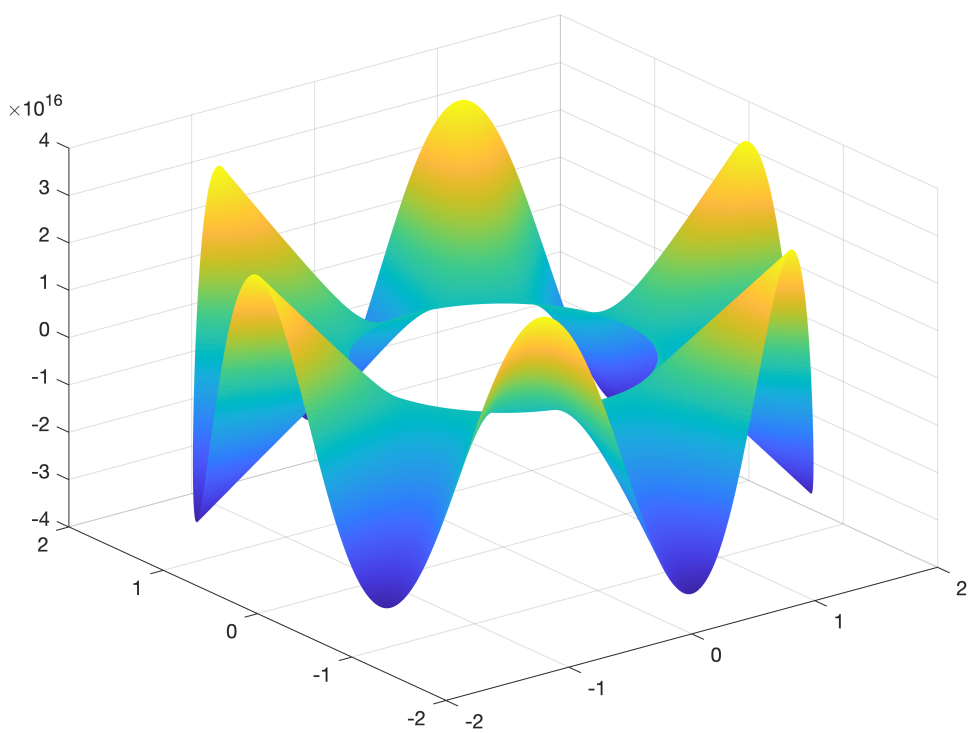

1500
1000
500
0
-500
-1000
-1500
2
1
0
-1
-2
-2
-1
0
1
2

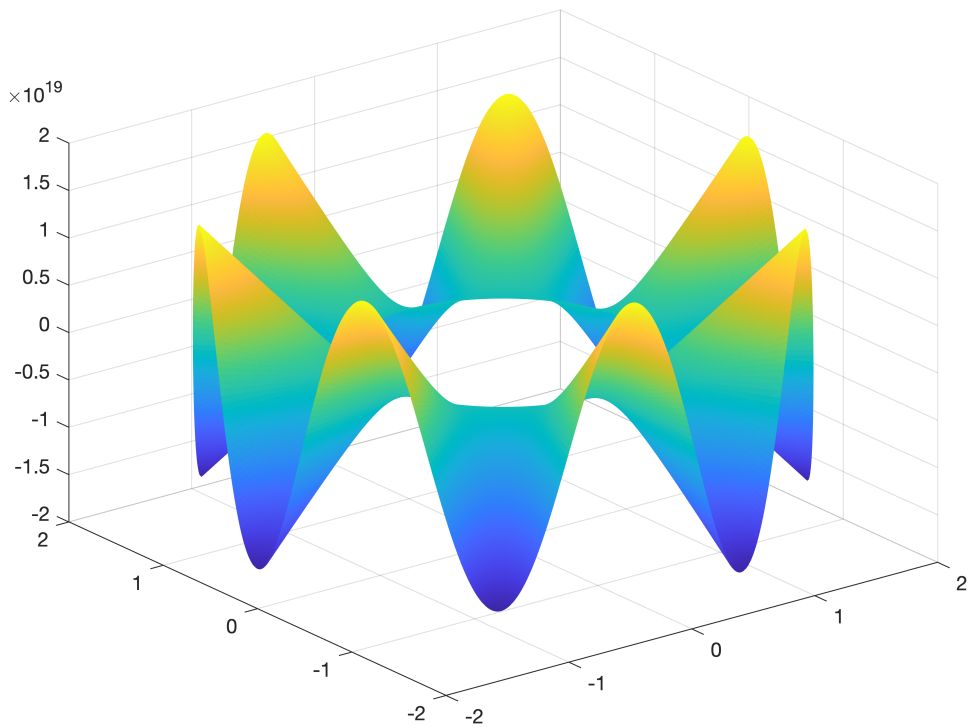

×10^5
6
4
2
0
-2
-4
-6
2
1
0
-1
-2
-2
-1
0
1
2

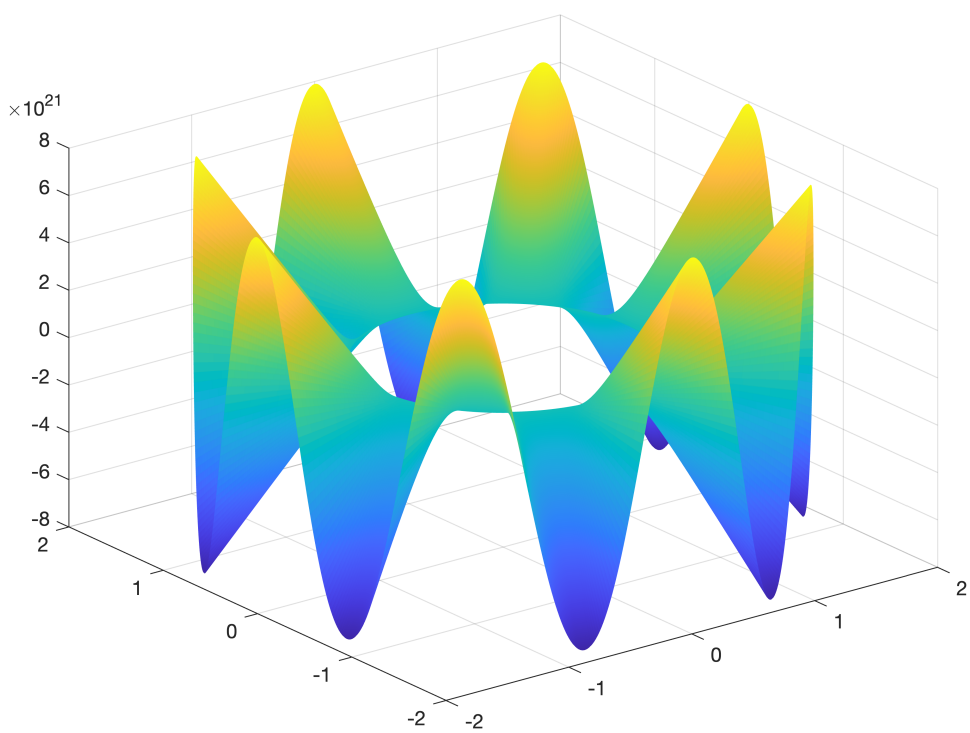

×10^8
3
2
1
0
-1
-2
-3
2
1
0
-1
-2
-2
-1
0
1
2

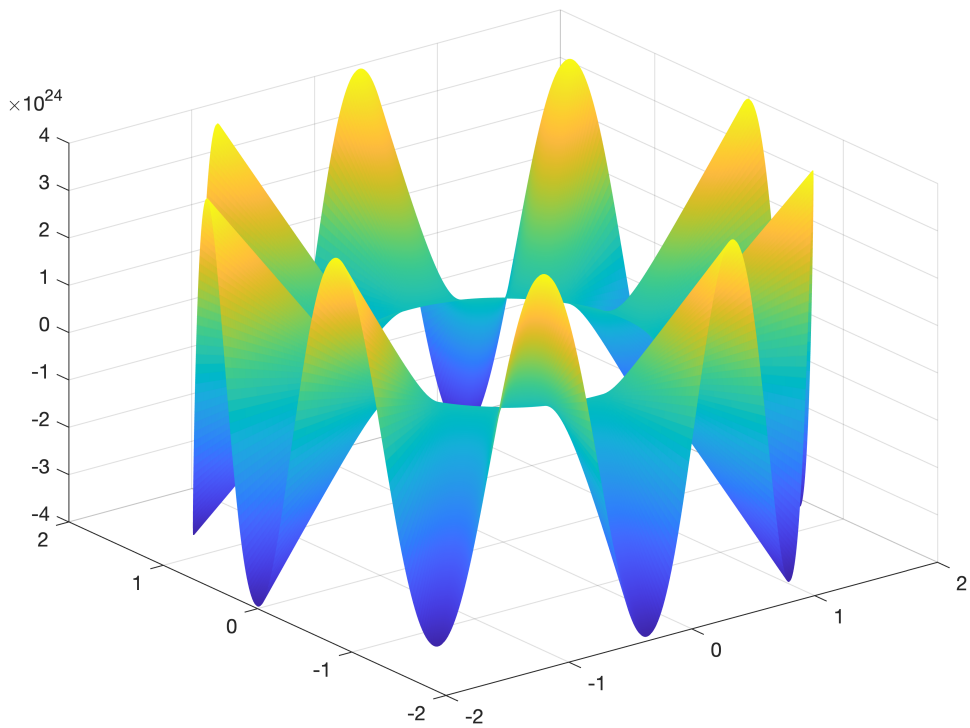

×10^11
1.5
1
0.5
0
-0.5
-1
-1.5
2
1
0
-1
-2
-2
-1
0
1
2

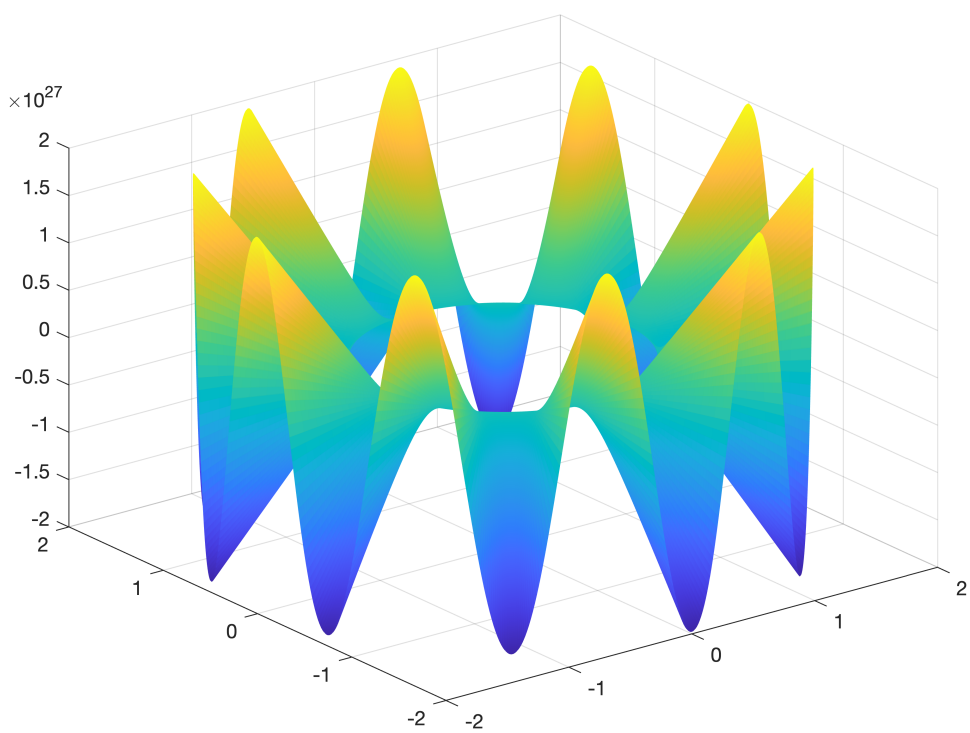

×10^13
8
6
4
2
0
-2
-4
-6
-8
2
1
0
-1
-2
-2
-1
0
1
2


×10^16
4
3
2
1
0
-1
-2
-3
-4
2
1
0
-1
-2
-2
-1
0
1
2


×10^19
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
2
1
0
-1
-2
-2
-1
0
1
2


×10^21
8
6
4
2
0
-2
-4
-6
-8
2
1
0
-1
-2
-2
-1
0
1
2


×10^24
4
3
2
1
0
-1
-2
-3
-4
2
1
0
-1
-2
-2
-1
0
1
2


×10^27
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
2
1
0
-1
-2
-2
-1
0
1
2

```
end
```