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```
% Nikhil Jayswal  
% MATH 3890  
% Machine Problem 8  
% 16 April 2021
```

```
clc; clear; close all
```

Get Triangulation Data

```
[n, x, y, nt, TRI] = readtri;
```

Set up lists

```
[nb, ne, nt, v1, v2, v3, e1, e2, e3, ie1, ie2, tril, trir, bdy, ...  
 vadj, eadj, adjstart, tadj, tstart, area, TRI] = trilists(x, y, TRI);
```

Prompt for d and lambda

```
d = input('Enter the value of d: ');  
lambda = input('Enter the value of lambda: ');
```

Franke's function

```
f = @(x, y) franke2(x, y);
```

Setup matrix E

```
E = c1smooth(d,x,y,v1,v2,v3,e1,e2,e3,ie1,ie2,tril,trir);
```

Compute coefficients

```
tic  
c = intDP1(d,x,y,v1,v2,v3,e1,e2,e3,ie1,ie2,f,E,lambda);  
tcomp = toc;
```

Evaluate the spline

```
ng = 51;
a = min(x); b = max(x); aw = min(y); bw = max(y);
[xg, yg, g] = valspgrid(d, x, y, v1, v2, v3, e1, e2, e3, ie1, c, ng, ...
    a, b, aw, bw);
```

Plot the spline

```
figure; surf(xg,yg,g'); colormap(copper);
titlestring = ['Interpolating Spline, d = ', num2str(d), ...
    ', \lambda = ', num2str(lambda)];
title(titlestring)
```

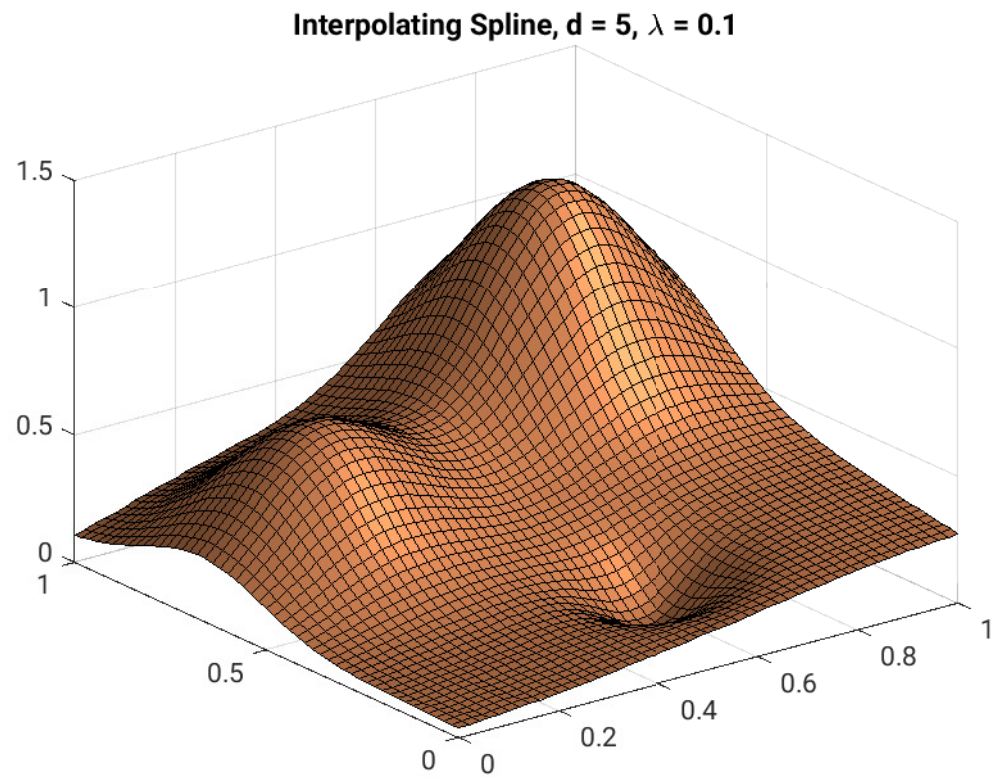
Compute errors

```
e = errg(xg,yg,g,@franke2);
fprintf('emax =%5.2e, RMS = %5.2e\n',norm(e,inf),erms(e));
```

Report computation time and c1ck value

```
fprintf('Computation time = %f seconds\n', tcomp);
c1ck(d,x,y,v1,v2,v3,e1,e2,e3,ie1,ie2,tril,trir,c);
```

```
file name for triangulation    'type2.25'  
Enter the value of d: 5  
Enter the value of lambda: 0.1  
emax =1.42e-03, RMS = 9.43e-05  
Computation time = 0.082662 seconds  
click 0.000691673
```



```
file name for triangulation 'type2.81'  
Enter the value of d: 5  
Enter the value of lambda: 0.1  
emax =3.35e-05, RMS = 2.18e-06  
Computation time = 2.095503 seconds  
click 1.41875e-05
```

