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Winter 2020 - MATH-579

with 5 Linear Elements

Nodes along x axis:

0 0.000000
1 0.200000
2 0.400000
3 0.600000
4 0.800000
5 1.000000

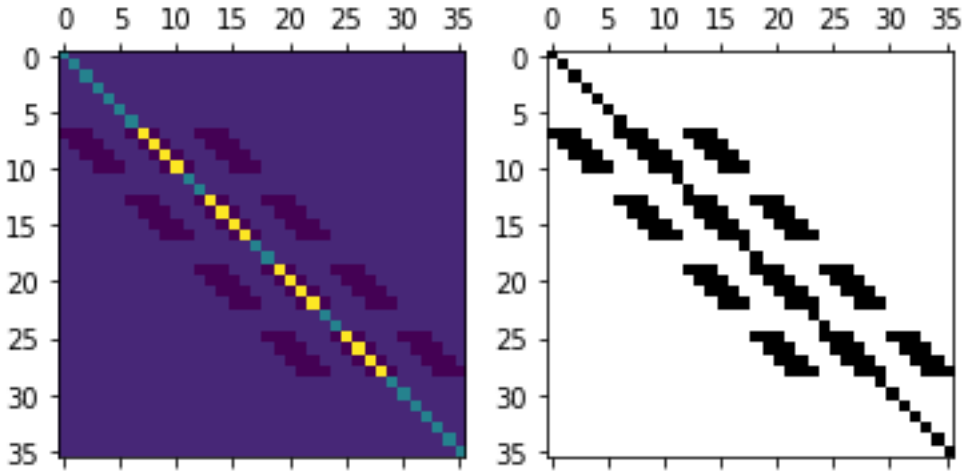
The elements, listing the nodes in counterclockwise order

0	1	7	6
1	2	8	7
2	3	9	8
3	4	10	9
4	5	11	10
6	7	13	12
7	8	14	13
8	9	15	14
9	10	16	15
10	11	17	16
12	13	19	18
13	14	20	19
14	15	21	20
15	16	22	21
16	17	23	22
18	19	25	24
19	20	26	25
20	21	27	26
21	22	28	27
22	23	29	28
24	25	31	30
25	26	32	31
26	27	33	32
27	28	34	33
28	29	35	34

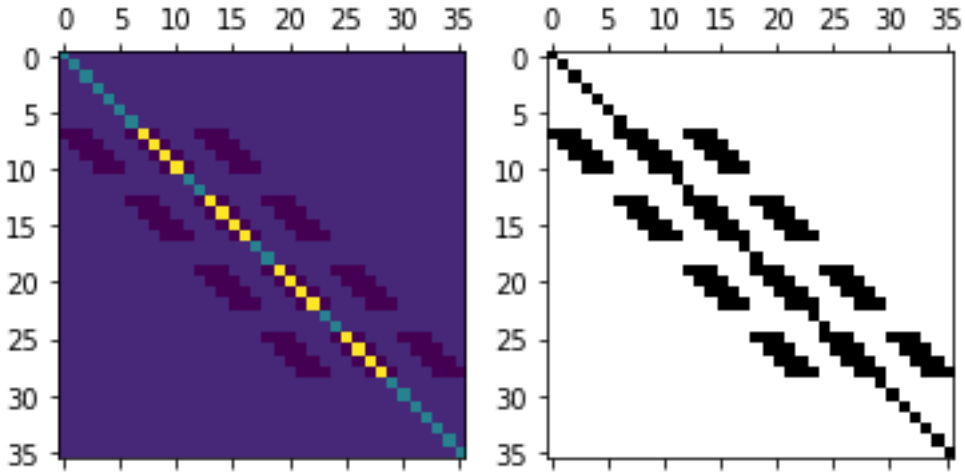
Node	x	y	u	u_exact
0	0.000000	0.000000	0	0
1	0.200000	0.000000	0	0

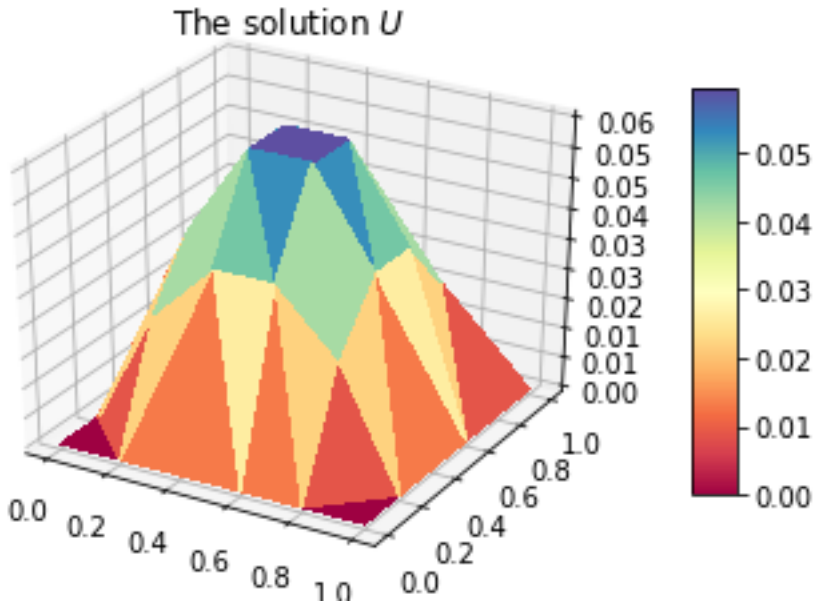
2	0.400000	0.000000	0	0
3	0.600000	0.000000	0	0
4	0.800000	0.000000	0	0
5	1.000000	0.000000	0	0
6	0.000000	0.200000	0	0
7	0.200000	0.200000	0.0265684	0.0256
8	0.400000	0.200000	0.0397263	0.0384
9	0.600000	0.200000	0.0397263	0.0384
10	0.800000	0.200000	0.0265684	0.0256
11	1.000000	0.200000	0	0
12	0.000000	0.400000	0	0
13	0.200000	0.400000	0.0397263	0.0384
14	0.400000	0.400000	0.0594947	0.0576
15	0.600000	0.400000	0.0594947	0.0576
16	0.800000	0.400000	0.0397263	0.0384
17	1.000000	0.400000	0	0
18	0.000000	0.600000	0	0
19	0.200000	0.600000	0.0397263	0.0384
20	0.400000	0.600000	0.0594947	0.0576
21	0.600000	0.600000	0.0594947	0.0576
22	0.800000	0.600000	0.0397263	0.0384
23	1.000000	0.600000	0	0
24	0.000000	0.800000	0	0
25	0.200000	0.800000	0.0265684	0.0256
26	0.400000	0.800000	0.0397263	0.0384
27	0.600000	0.800000	0.0397263	0.0384
28	0.800000	0.800000	0.0265684	0.0256
29	1.000000	0.800000	0	0
30	0.000000	1.000000	0	0
31	0.200000	1.000000	0	0
32	0.400000	1.000000	0	0
33	0.600000	1.000000	0	0
34	0.800000	1.000000	0	0
35	1.000000	1.000000	0	0

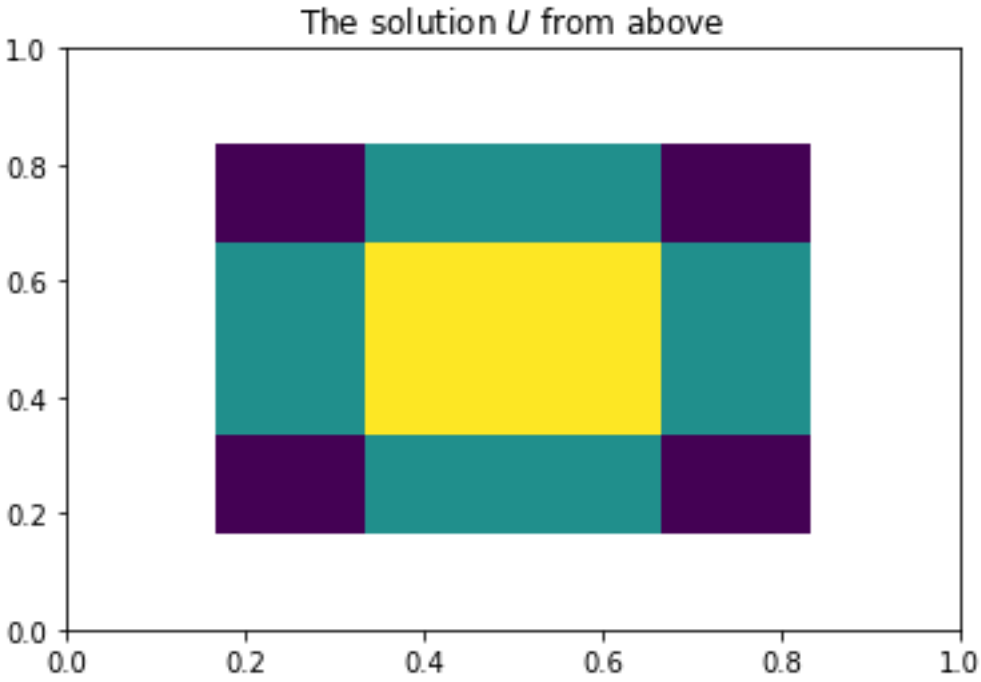
The Stiffness Matrix



The Stiffness Matrix with BC contribution

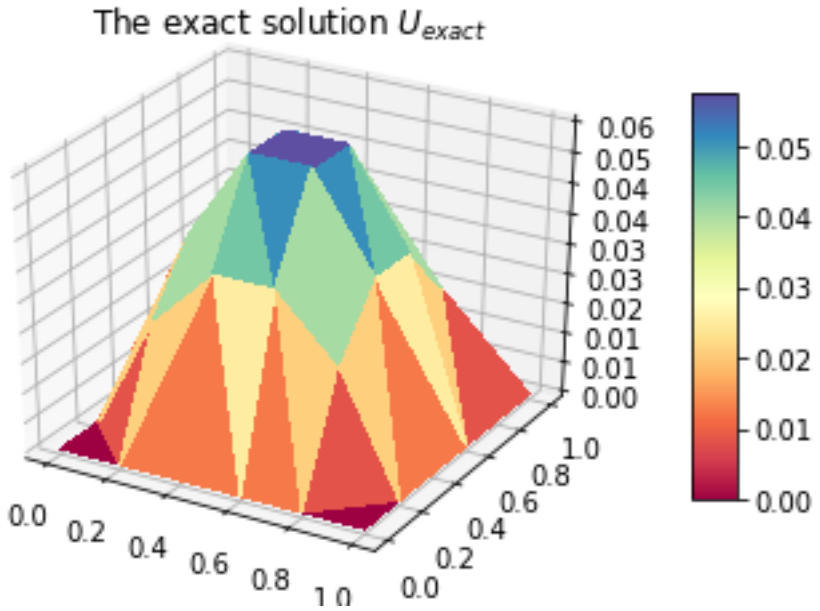




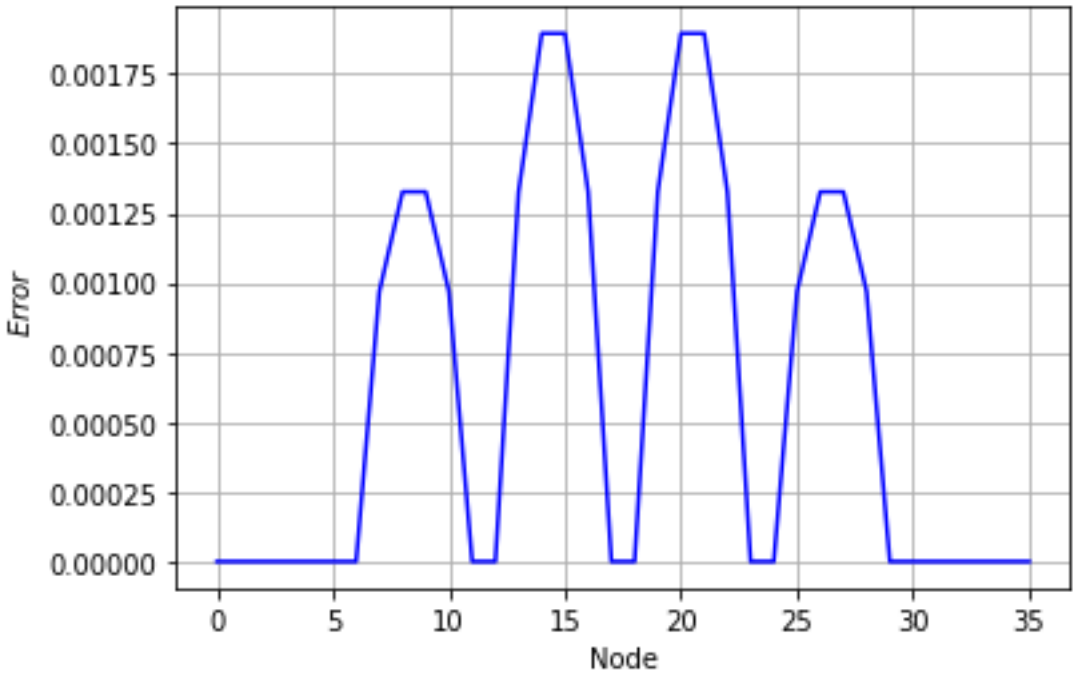


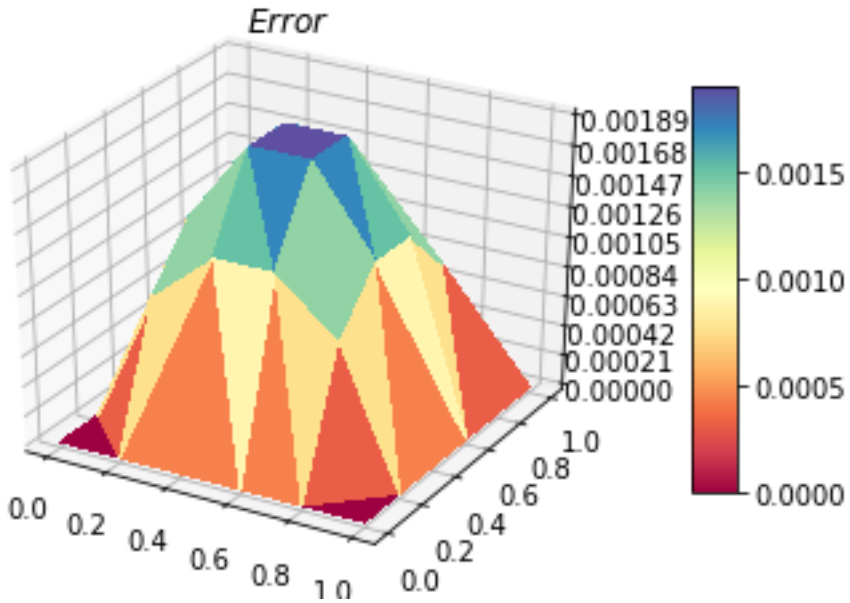
##

The Exact Solution
U_exact = xy(1-x)(1-y)
evaluated on each node is


The exact solution U_{exact}
0.06
0.05
0.04
0.04
0.03
0.03
0.02
0.01
0.01
0.00
0.0
0.2
0.4
0.6
0.8
1.0
0.0
0.2
0.4
0.6
0.8
1.0
0.05
0.04
0.03
0.02
0.01
0.00

##


0.00175
0.00150
0.00125
0.00100
0.00075
0.00050
0.00025
0.00000
Error
0
5
10
15
20
25
30
35
Node




```
        The L2 error =  0.0015243643100346918

        The H1 error =  0.029991468572487474
```

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############################################################
```

```
  >> Normal end of execution.
```

In [2]: