For Q1-Q4 x increases from T-B and y increases from L-R in matrix of approximated value, error, and original value

Q1:
tol=.00001
h=0.25 for both x and y
approximated value =

```
     0   0.0625   0.2500   0.5625   1.0000   1.5625   2.2500   3.0625   4.0000
0.0625   0.0000   0.0625   0.2500   0.5625   1.0000   1.5625   2.2500   3.0625
0.2500   0.0625   0.0000   0.0625   0.2500   0.5625   1.0000   1.5625   2.2500
0.5625   0.2500   0.0625   0.0000   0.0625   0.2500   0.5625   1.0000   1.5625
1.0000   0.5625   0.2500   0.0625        0   0.0625   0.2500   0.5625   1.0000
```

nodesX =

```
     0   0.2500   0.5000   0.7500   1.0000
```

nodesY =

```
     0   0.2500   0.5000   0.7500   1.0000   1.2500   1.5000   1.7500   2.0000
```

error =

  1.0e-04 *

```
     0        0        0        0        0        0        0        0        0
     0   0.1009   0.1844   0.2434   0.2604   0.2431   0.1839   0.1006        0
     0   0.1411   0.2636   0.3404   0.3723   0.3400   0.2630   0.1407        0
     0   0.1009   0.1844   0.2434   0.2604   0.2431   0.1839   0.1006        0
     0        0        0        0        0        0        0        0        0
```

original value =

```
     0   0.0625   0.2500   0.5625   1.0000   1.5625   2.2500   3.0625   4.0000
0.0625        0   0.0625   0.2500   0.5625   1.0000   1.5625   2.2500   3.0625
0.2500   0.0625        0   0.0625   0.2500   0.5625   1.0000   1.5625   2.2500
0.5625   0.2500   0.0625        0   0.0625   0.2500   0.5625   1.0000   1.5625
1.0000   0.5625   0.2500   0.0625        0   0.0625   0.2500   0.5625   1.0000
```

global error =

  3.7231e-05

Q2:
h=0.25
tol=0.00001
approximatevalue =

```
     0    0.0606   0.2231   0.4463   0.6931
  0.4463   0.4848   0.5944   0.7539   0.9410
  0.8109   0.8377   0.9159   1.0341   1.1787
  1.1192   1.1390   1.1974   1.2878   1.4018
  1.3863   1.4018   1.4469   1.5179   1.6094
```

nodesX =

```
  1.0000   1.2500   1.5000   1.7500   2.0000
```

nodesY =

```
     0    0.2500   0.5000   0.7500   1.0000
```

Error =

  1.0e-03 *

```
     0        0        0        0        0
     0    0.7534   0.2673   0.1776      0
     0    0.6733   0.3893   0.0033      0
     0    0.4071   0.2906   0.0620      0
     0        0        0        0        0
```

originalvalue =

```
     0    0.0606   0.2231   0.4463   0.6931
  0.4463   0.4855   0.5947   0.7538   0.9410
  0.8109   0.8383   0.9163   1.0341   1.1787
  1.1192   1.1394   1.1977   1.2879   1.4018
  1.3863   1.4018   1.4469   1.5179   1.6094
```

globalerror =

  7.5343e-04

Q3:
h=0.25
tol=0.00001

approximatevalue =

0	0	0	0	0
0	0.0625	0.1250	0.1875	0.2500
0	0.1250	0.2500	0.3750	0.5000
0	0.1875	0.3750	0.5625	0.7500
0	0.2500	0.5000	0.7500	1.0000

nodesX =

0	0.2500	0.5000	0.7500	1.0000

nodesY =

0	0.2500	0.5000	0.7500	1.0000

Error =

  1.0e-04 *

0	0	0	0	0
0	0.0858	0.1144	0.0858	0
0	0.1144	0.1717	0.1144	0
0	0.0858	0.1144	0.0858	0
0	0	0	0	0

originalvalue =

0	0	0	0	0
0	0.0625	0.1250	0.1875	0.2500
0	0.1250	0.2500	0.3750	0.5000
0	0.1875	0.3750	0.5625	0.7500
0	0.2500	0.5000	0.7500	1.0000

globalerror =

  1.7166e-05

Q4:
h=0.25
tol=0.00001

approximatevalue =

0	0.2789	0.6082	0.9793	1.3863
0.2789	0.6988	1.1811	1.7154	2.2907
0.6082	1.1811	1.8271	2.5355	3.2958
0.9793	1.7154	2.5355	3.4289	4.3847
1.3863	2.2907	3.2958	4.3847	5.5452

nodesX =

1.0000	1.2500	1.5000	1.7500	2.0000

nodesY =

1.0000	1.2500	1.5000	1.7500	2.0000

Error =

0	0	0	0	0
0	0.0014	0.0025	0.0031	0
0	0.0025	0.0025	0.0022	0.0000
0	0.0031	0.0022	0.0012	0
0	0	0	0	0

originalvalue =

0	0.2789	0.6082	0.9793	1.3863
0.2789	0.6973	1.1786	1.7123	2.2907
0.6082	1.1786	1.8246	2.5333	3.2958
0.9793	1.7123	2.5333	3.4276	4.3847
1.3863	2.2907	3.2958	4.3847	5.5452

globalerror =

0.0031

for Q5-Q8 t increases from T-B and x increases from L-R in matrix of approximated value, error, and original value

Q5:
hx=0.25
ht=0.03
upper limit of t=0.48
approximatevalue =

```
     0   0.7071   1.0000   0.7071   0.0000
     0   0.5083   0.7188   0.5083      0
     0   0.3654   0.5167   0.3654      0
     0   0.2626   0.3714   0.2626      0
     0   0.1888   0.2670   0.1888      0
     0   0.1357   0.1919   0.1357      0
     0   0.0975   0.1380   0.0975      0
     0   0.0701   0.0992   0.0701      0
     0   0.0504   0.0713   0.0504      0
     0   0.0362   0.0512   0.0362      0
     0   0.0260   0.0368   0.0260      0
     0   0.0187   0.0265   0.0187      0
     0   0.0135   0.0190   0.0135      0
     0   0.0097   0.0137   0.0097      0
     0   0.0070   0.0098   0.0070      0
     0   0.0050   0.0071   0.0050      0
     0   0.0036   0.0051   0.0036      0
```

nodesX =

```
     0   0.2500   0.5000   0.7500   1.0000
```

nodesY =

  Columns 1 through 15

```
     0   0.0300   0.0600   0.0900   0.1200   0.1500   0.1800   0.2100   0.2400   0.2700
0.3000   0.3300   0.3600   0.3900   0.4200
```

  Columns 16 through 17

```
  0.4500   0.4800
```

Error =

```
     0        0        0        0        0
     0   0.0176   0.0249   0.0176   0.0000
     0   0.0258   0.0364   0.0258   0.0000
     0   0.0282   0.0399   0.0282   0.0000
     0   0.0275   0.0390   0.0275   0.0000
```

```
0    0.0252    0.0356    0.0252    0.0000
0    0.0221    0.0313    0.0221    0.0000
0    0.0189    0.0267    0.0189    0.0000
0    0.0158    0.0223    0.0158    0.0000
0    0.0130    0.0184    0.0130    0.0000
0    0.0106    0.0149    0.0106    0.0000
0    0.0085    0.0120    0.0085    0.0000
0    0.0068    0.0096    0.0068    0.0000
0    0.0054    0.0076    0.0054    0.0000
0    0.0042    0.0060    0.0042    0.0000
0    0.0033    0.0047    0.0033    0.0000
0    0.0026    0.0037    0.0026    0.0000
```

originalvalue =

```
0    0.7071    1.0000    0.7071    0.0000
0    0.5259    0.7437    0.5259    0.0000
0    0.3911    0.5531    0.3911    0.0000
0    0.2909    0.4114    0.2909    0.0000
0    0.2163    0.3059    0.2163    0.0000
0    0.1609    0.2275    0.1609    0.0000
0    0.1197    0.1692    0.1197    0.0000
0    0.0890    0.1259    0.0890    0.0000
0    0.0662    0.0936    0.0662    0.0000
0    0.0492    0.0696    0.0492    0.0000
0    0.0366    0.0518    0.0366    0.0000
0    0.0272    0.0385    0.0272    0.0000
0    0.0202    0.0286    0.0202    0.0000
0    0.0151    0.0213    0.0151    0.0000
0    0.0112    0.0158    0.0112    0.0000
0    0.0083    0.0118    0.0083    0.0000
0    0.0062    0.0088    0.0062    0.0000
```

globalerror =

   0.0399

Q6:
hx=0.25
ht=0.03
upper limit of t=0.48
approximatevalue =

```
0    0.3827    0.7071    0.9239    1.0000    0.9239    0.7071    0.3827    0.0000
0    0.3547    0.6554    0.8564    0.9269    0.8564    0.6554    0.3547    0
0    0.3288    0.6075    0.7938    0.8592    0.7938    0.6075    0.3288    0
0    0.3048    0.5631    0.7358    0.7964    0.7358    0.5631    0.3048    0
0    0.2825    0.5220    0.6820    0.7382    0.6820    0.5220    0.2825    0
0    0.2619    0.4838    0.6322    0.6843    0.6322    0.4838    0.2619    0
0    0.2427    0.4485    0.5860    0.6343    0.5860    0.4485    0.2427    0
```

```
    0   0.2250   0.4157   0.5432   0.5879   0.5432   0.4157   0.2250       0
    0   0.2085   0.3853   0.5035   0.5449   0.5035   0.3853   0.2085       0
    0   0.1933   0.3572   0.4667   0.5051   0.4667   0.3572   0.1933       0
    0   0.1792   0.3311   0.4326   0.4682   0.4326   0.3311   0.1792       0
    0   0.1661   0.3069   0.4010   0.4340   0.4010   0.3069   0.1661       0
    0   0.1539   0.2845   0.3717   0.4023   0.3717   0.2845   0.1539       0
    0   0.1427   0.2637   0.3445   0.3729   0.3445   0.2637   0.1427       0
    0   0.1323   0.2444   0.3193   0.3456   0.3193   0.2444   0.1323       0
    0   0.1226   0.2265   0.2960   0.3204   0.2960   0.2265   0.1226       0
    0   0.1136   0.2100   0.2744   0.2970   0.2744   0.2100   0.1136       0
```

nodesX =

```
    0   0.2500   0.5000   0.7500   1.0000   1.2500   1.5000   1.7500   2.0000
```

nodesY =

 Columns 1 through 15

```
    0   0.0300   0.0600   0.0900   0.1200   0.1500   0.1800   0.2100   0.2400   0.2700
0.3000   0.3300   0.3600   0.3900   0.4200
```

 Columns 16 through 17

```
  0.4500   0.4800
```

Error =

```
    0        0        0        0        0        0        0        0        0
    0   0.0007   0.0012   0.0016   0.0017   0.0016   0.0012   0.0007   0.0000
    0   0.0012   0.0023   0.0030   0.0032   0.0030   0.0023   0.0012   0.0000
    0   0.0017   0.0032   0.0041   0.0045   0.0041   0.0032   0.0017   0.0000
    0   0.0021   0.0039   0.0051   0.0055   0.0051   0.0039   0.0021   0.0000
    0   0.0024   0.0045   0.0059   0.0064   0.0059   0.0045   0.0024   0.0000
    0   0.0027   0.0050   0.0066   0.0071   0.0066   0.0050   0.0027   0.0000
    0   0.0030   0.0055   0.0071   0.0077   0.0071   0.0055   0.0030   0.0000
    0   0.0031   0.0058   0.0076   0.0082   0.0076   0.0058   0.0031   0.0000
    0   0.0033   0.0060   0.0079   0.0085   0.0079   0.0060   0.0033   0.0000
    0   0.0034   0.0062   0.0081   0.0088   0.0081   0.0062   0.0034   0.0000
    0   0.0034   0.0063   0.0083   0.0090   0.0083   0.0063   0.0034   0.0000
    0   0.0035   0.0064   0.0084   0.0091   0.0084   0.0064   0.0035   0.0000
    0   0.0035   0.0065   0.0084   0.0091   0.0084   0.0065   0.0035   0.0000
    0   0.0035   0.0065   0.0084   0.0091   0.0084   0.0065   0.0035   0.0000
    0   0.0035   0.0064   0.0084   0.0091   0.0084   0.0064   0.0035   0.0000
    0   0.0034   0.0063   0.0083   0.0090   0.0083   0.0063   0.0034   0.0000
```

originalvalue =

```
0   0.3827   0.7071   0.9239   1.0000   0.9239   0.7071   0.3827   0.0000
0   0.3554   0.6567   0.8580   0.9287   0.8580   0.6567   0.3554   0.0000
0   0.3300   0.6098   0.7967   0.8624   0.7967   0.6098   0.3300   0.0000
0   0.3065   0.5663   0.7399   0.8009   0.7399   0.5663   0.3065   0.0000
0   0.2846   0.5259   0.6871   0.7437   0.6871   0.5259   0.2846   0.0000
0   0.2643   0.4884   0.6381   0.6907   0.6381   0.4884   0.2643   0.0000
0   0.2454   0.4535   0.5926   0.6414   0.5926   0.4535   0.2454   0.0000
0   0.2279   0.4212   0.5503   0.5956   0.5503   0.4212   0.2279   0.0000
0   0.2117   0.3911   0.5110   0.5531   0.5110   0.3911   0.2117   0.0000
0   0.1966   0.3632   0.4746   0.5137   0.4746   0.3632   0.1966   0.0000
0   0.1825   0.3373   0.4407   0.4770   0.4407   0.3373   0.1825   0.0000
0   0.1695   0.3132   0.4093   0.4430   0.4093   0.3132   0.1695   0.0000
0   0.1574   0.2909   0.3801   0.4114   0.3801   0.2909   0.1574   0.0000
0   0.1462   0.2701   0.3529   0.3820   0.3529   0.2701   0.1462   0.0000
0   0.1358   0.2509   0.3278   0.3548   0.3278   0.2509   0.1358   0.0000
0   0.1261   0.2330   0.3044   0.3295   0.3044   0.2330   0.1261   0.0000
0   0.1171   0.2163   0.2827   0.3059   0.2827   0.2163   0.1171   0.0000
```

globalerror =

   0.0091

Q7:

hx=pi/6
ht=0.1
upper limit of t=1.0

approximatevalue =

```
0   0.5000   0.8660   1.0000   0.8660   0.5000   0.0000
0   0.4511   0.7814   0.9023   0.7814   0.4511        0
0   0.4070   0.7050   0.8141   0.7050   0.4070        0
0   0.3673   0.6361   0.7345   0.6361   0.3673        0
0   0.3314   0.5739   0.6627   0.5739   0.3314        0
0   0.2990   0.5178   0.5980   0.5178   0.2990        0
0   0.2698   0.4672   0.5395   0.4672   0.2698        0
0   0.2434   0.4216   0.4868   0.4216   0.2434        0
0   0.2196   0.3804   0.4392   0.3804   0.2196        0
0   0.1981   0.3432   0.3963   0.3432   0.1981        0
0   0.1788   0.3096   0.3575   0.3096   0.1788        0
```

nodesX =

   0   0.5236   1.0472   1.5708   2.0944   2.6180   3.1416

nodesY =

   0   0.1000   0.2000   0.3000   0.4000   0.5000   0.6000   0.7000   0.8000   0.9000

1.0000

Error =

0	0	0	0	0	0	0
0	0.0013	0.0022	0.0026	0.0022	0.0013	0.0000
0	0.0023	0.0040	0.0047	0.0040	0.0023	0.0000
0	0.0032	0.0055	0.0063	0.0055	0.0032	0.0000
0	0.0038	0.0066	0.0076	0.0066	0.0038	0.0000
0	0.0043	0.0074	0.0086	0.0074	0.0043	0.0000
0	0.0046	0.0081	0.0093	0.0081	0.0046	0.0000
0	0.0049	0.0085	0.0098	0.0085	0.0049	0.0000
0	0.0051	0.0088	0.0101	0.0088	0.0051	0.0000
0	0.0051	0.0089	0.0103	0.0089	0.0051	0.0000
0	0.0052	0.0089	0.0103	0.0089	0.0052	0.0000

originalvalue =

0	0.5000	0.8660	1.0000	0.8660	0.5000	0.0000
0	0.4524	0.7836	0.9048	0.7836	0.4524	0.0000
0	0.4094	0.7090	0.8187	0.7090	0.4094	0.0000
0	0.3704	0.6416	0.7408	0.6416	0.3704	0.0000
0	0.3352	0.5805	0.6703	0.5805	0.3352	0.0000
0	0.3033	0.5253	0.6065	0.5253	0.3033	0.0000
0	0.2744	0.4753	0.5488	0.4753	0.2744	0.0000
0	0.2483	0.4301	0.4966	0.4301	0.2483	0.0000
0	0.2247	0.3891	0.4493	0.3891	0.2247	0.0000
0	0.2033	0.3521	0.4066	0.3521	0.2033	0.0000
0	0.1839	0.3186	0.3679	0.3186	0.1839	0.0000

globalerror =

   0.0103

Q8:

hx=0.5
ht=0.1
upper limit of t=1.0

approximatevalue =

0	1.0898	1.7071	1.6310	1.0000	0.2168	-0.2929	-0.3244	-0.0000
0	1.0132	1.5947	1.5410	0.9753	0.2611	-0.2154	-0.2667	0
0	0.9432	1.4917	1.4580	0.9512	0.2997	-0.1465	-0.2152	0
0	0.8792	1.3973	1.3813	0.9278	0.3330	-0.0853	-0.1691	0
0	0.8207	1.3108	1.3104	0.9049	0.3616	-0.0311	-0.1281	0
0	0.7671	1.2312	1.2447	0.8825	0.3860	0.0169	-0.0916	0
0	0.7180	1.1582	1.1838	0.8608	0.4067	0.0591	-0.0592	0

0	0.6729	1.0910	1.1273	0.8395	0.4239	0.0963	-0.0304	0
0	0.6316	1.0291	1.0748	0.8188	0.4382	0.1289	-0.0049	0
0	0.5937	0.9721	1.0259	0.7986	0.4497	0.1573	0.0176	0
0	0.5588	0.9194	0.9803	0.7789	0.4589	0.1821	0.0374	0

nodesX =

0	0.5000	1.0000	1.5000	2.0000	2.5000	3.0000	3.5000	4.0000

nodesY =

0	0.1000	0.2000	0.3000	0.4000	0.5000	0.6000	0.7000	0.8000	0.9000

1.0000

Error =

1.0e-03 *

0	0	0.0000	0	0	0.0000	0	0.0000	0
0	0.1441	0.2053	0.1493	0.0097	0.1314	0.1916	0.1366	0.0000
0	0.2612	0.3726	0.2715	0.0190	0.2365	0.3458	0.2467	0.0000
0	0.3554	0.5072	0.3704	0.0277	0.3191	0.4680	0.3341	0.0000
0	0.4298	0.6138	0.4493	0.0361	0.3827	0.5628	0.4022	0.0000
0	0.4874	0.6965	0.5112	0.0440	0.4299	0.6344	0.4537	0.0000
0	0.5307	0.7590	0.5585	0.0515	0.4634	0.6863	0.4913	0.0000
0	0.5619	0.8043	0.5936	0.0585	0.4854	0.7215	0.5171	0.0000
0	0.5829	0.8352	0.6182	0.0653	0.4976	0.7429	0.5330	0.0000
0	0.5954	0.8539	0.6342	0.0716	0.5018	0.7526	0.5406	0.0000
0	0.6008	0.8626	0.6428	0.0776	0.4994	0.7528	0.5414	0.0000

originalvalue =

0	1.0898	1.7071	1.6310	1.0000	0.2168	-0.2929	-0.3244	-0.0000
0	1.0131	1.5945	1.5409	0.9753	0.2613	-0.2152	-0.2666	-0.0000
0	0.9429	1.4914	1.4578	0.9512	0.2999	-0.1461	-0.2149	-0.0000
0	0.8789	1.3968	1.3810	0.9277	0.3333	-0.0848	-0.1688	-0.0000
0	0.8203	1.3101	1.3099	0.9048	0.3620	-0.0305	-0.1277	-0.0000
0	0.7666	1.2306	1.2442	0.8825	0.3864	0.0175	-0.0912	-0.0000
0	0.7174	1.1574	1.1833	0.8607	0.4071	0.0598	-0.0587	-0.0000
0	0.6724	1.0902	1.1267	0.8395	0.4244	0.0970	-0.0299	-0.0000
0	0.6310	1.0283	1.0741	0.8187	0.4387	0.1296	-0.0044	-0.0000
0	0.5931	0.9712	1.0252	0.7985	0.4502	0.1581	0.0181	-0.0000
0	0.5582	0.9186	0.9796	0.7788	0.4594	0.1828	0.0379	0.0000

globalerror =

8.6255e-04