CFD2 - HW1

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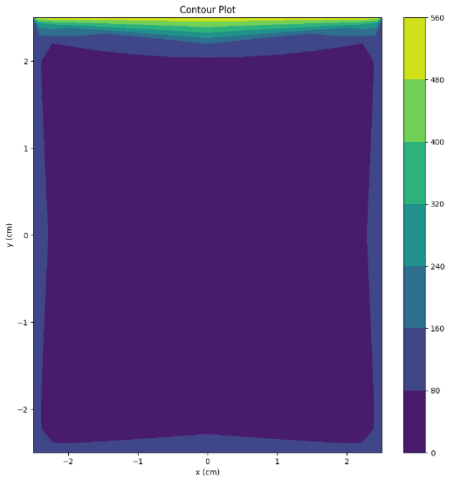
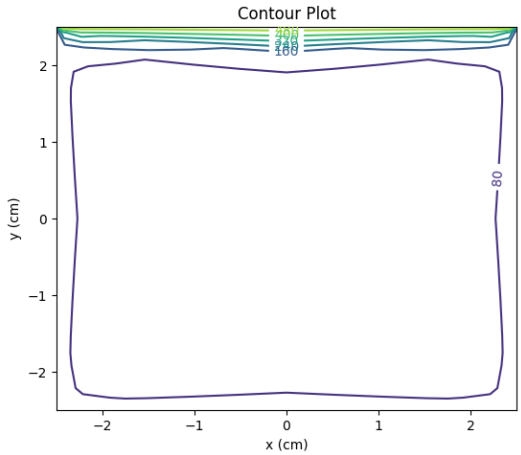
- This file contains results for first assignment which calculating temperature distribution in a two-dimensional plate at steady state.
- Programming language: Python 3
- With all dt the answer will be achieved

  Thank you!

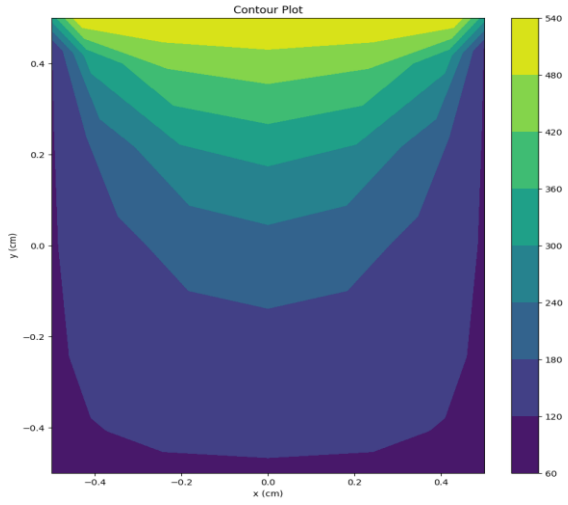
Not steady state solution at iterate 100 from 260 total:





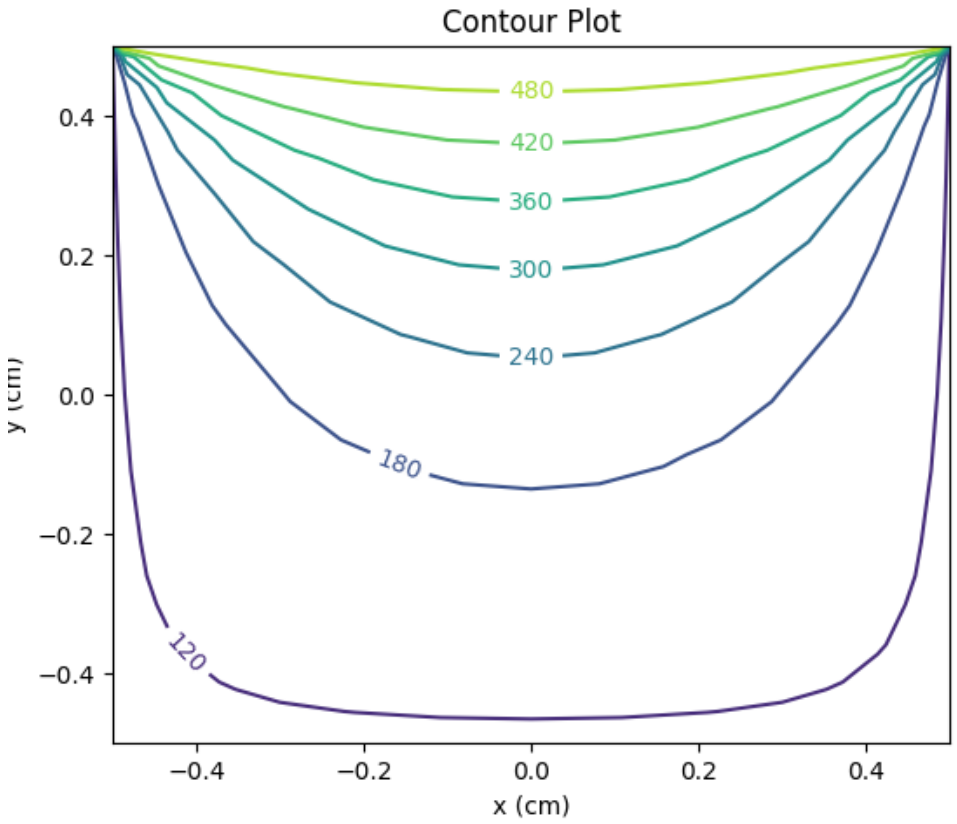
Steady state solution: for 7*7 grid:

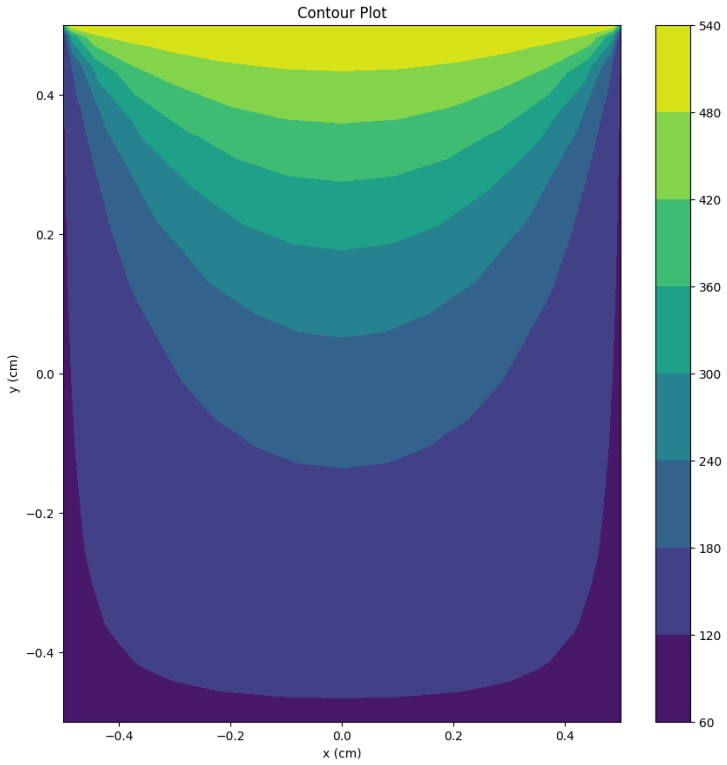
	0	1	2	3	4	5	6
0	325.00000	535.00000	535.00000	535.00000	535.00000	535.00000	325.00000
1	115.00000	322.38684	410.23032	402.56294	410.23032	322.38684	115.00000
2	115.00000	211.20570	284.36654	295.02440	284.36654	211.20570	115.00000
3	115.00000	168.01801	205.10090	219.19043	205.10090	168.01801	115.00000
4	115.00000	129.81930	154.60102	171.97220	154.60102	129.81930	115.00000
5	115.00000	117.53241	127.91302	139.79487	127.91302	117.53241	115.00000
6	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000



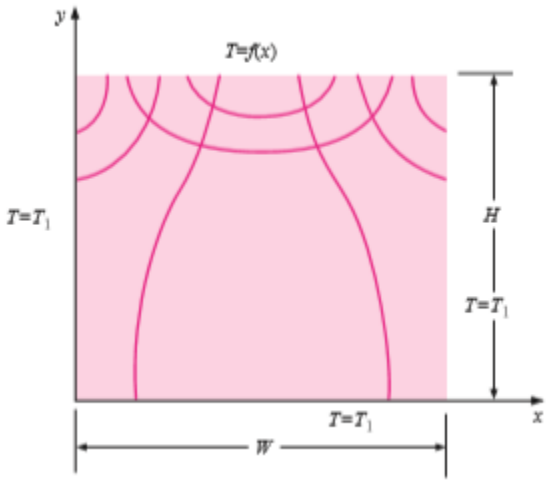
Steady state solution for 15x15:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	325.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	535.00000	325.00000
1	115.00000	324.92376	448.47624	474.75825	483.84883	485.70330	482.96292	475.29716	482.96292	485.70330	483.84883	474.75825	448.47624	324.92376	115.00000
2	115.00000	200.69366	323.37404	390.63207	419.04538	429.18026	428.23054	418.30924	428.23054	429.18026	419.04538	390.63207	323.37404	200.69366	115.00000
3	115.00000	172.62883	251.26581	316.34942	354.55957	371.95261	374.82460	366.31367	374.82460	371.95261	354.55957	316.34942	251.26581	172.62883	115.00000
4	115.00000	159.93403	214.58766	264.57278	300.07504	319.64639	325.61724	320.40530	325.61724	319.64639	300.07504	264.57278	214.58766	159.93403	115.00000
5	115.00000	151.94756	192.01380	228.82523	257.31258	275.21764	282.73836	280.92789	282.73836	275.21764	257.31258	228.82523	192.01380	151.94756	115.00000
6	115.00000	145.43390	175.66895	202.64203	224.22242	239.04096	246.76234	247.58634	246.76234	239.04096	224.22242	202.64203	175.66895	145.43390	115.00000
7	115.00000	139.58772	162.54593	182.48032	198.54836	210.26300	217.40534	219.86339	217.40534	210.26300	198.54836	182.48032	162.54593	139.58772	115.00000
8	115.00000	128.42844	143.43276	158.72551	172.95590	184.71955	192.98045	197.07021	192.98045	184.71955	172.95590	158.72551	143.43276	128.42844	115.00000
9	115.00000	121.94843	131.16663	142.15364	153.78628	164.57873	173.03554	178.05384	173.03554	164.57873	153.78628	142.15364	131.16663	121.94843	115.00000
10	115.00000	118.26142	123.58066	130.94708	139.80326	148.92926	156.81354	162.07091	156.81354	148.92926	139.80326	130.94708	123.58066	118.26142	115.00000
11	115.00000	116.31948	119.08740	123.60339	129.76080	136.83591	143.51001	148.38525	143.51001	136.83591	129.76080	123.60339	119.08740	116.31948	115.00000
12	115.00000	115.41350	116.61669	118.96937	122.69872	127.49791	132.47167	136.36208	132.47167	127.49791	122.69872	118.96937	116.61669	115.41350	115.00000
13	115.00000	115.07580	115.41185	116.27868	117.92191	120.33872	123.08063	125.40610	123.08063	120.33872	117.92191	116.27868	115.41185	115.07580	115.00000
14	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000	115.00000





The exact solution from J.P Hofman Heat Transfer book:



SO OUR SOLUTION IS CORRECT.

This modeling was easy because of not implementing the convection term.

Thank you for your attention!