2-D LID-DRIVEN SQUARE CAVITY FLOW BENCHMARK Re = 1000

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Table 1. Cavity vortex map

	ψ	ϖ	x	y
PV	-0.118936603	-2.0677479	0.53079011	0.56524055
BR1	0.001729717	1.1092588	0.86404005	0.11180617
BR2	-5.03935E-08	-0.00842229	0.99232483	0.00765098
BR3	1.3073E-12	6.524E-05	0.99953382	0.00046608
BL1	0.0002334529	0.3520931	0.08327318	0.07809572
BL2	-6.39843E-09	-0.00267616	0.00484262	0.00484512
BL3	1.5503E-13	1.576E-05	0.00027149	0.00027149

Table 2. Vertical velocity across various horizontal planes

x	y = 0.05	y = 0.1	y = 0.5	y = 0.9	y = 0.99
1.0000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
0.9950	0.0008908	0.0028794	-0.0291290	-0.2483258	-0.5315738
0.9900	0.0017567	0.0054397	-0.0617528	-0.4446772	-0.3689984
0.9800	0.0033516	0.0096860	-0.1359277	-0.6574629	-0.1251260
0.9700	0.0047034	0.0128891	-0.2178657	-0.6607602	-0.0621618
0.9688	0.0048476	0.0132096	-0.2279225	-0.6522928	-0.0582317
0.9609	0.0056994	0.0150048	-0.2936869	-0.5768725	-0.0403150
0.9531	0.0063790	0.0162754	-0.3553213	-0.4952124	-0.0302091
0.9453	0.0069088	0.0170894	-0.4103754	-0.4231177	-0.0237116
0.9063	0.0077099	0.0152532	-0.5264392	-0.2074994	-0.0095384
0.8594	0.0051011	0.0014971	-0.4264545	-0.1045164	-0.0039896
0.8047	-0.0033125	-0.0276588	-0.3202137	-0.0597701	-0.0017567
0.6800	-0.0270199	-0.0827502	-0.1730887	-0.0193429	-0.0004456
0.5000	0.0001947	-0.0029492	0.0257995	0.0403155	0.0012549
0.3500	0.0201600	0.0636637	0.1882246	0.1106086	0.0037809
0.2344	0.0112680	0.0494267	0.3253592	0.1586062	0.0056093
0.2266	0.0104883	0.0469480	0.3339924	0.1602194	0.0057075
0.1563	0.0043219	0.0239565	0.3769189	0.1553913	0.0071528
0.0938	-0.0004455	0.0058905	0.3330442	0.1155853	0.0139622
0.0781	-0.0014974	0.0020380	0.3099097	0.1012963	0.0188190
0.0703	-0.0019435	0.0003324	0.2962703	0.0937457	0.0223919
0.0625	-0.0023149	-0.0011868	0.2807056	0.0858977	0.0271780
0.0400	-0.0027685	-0.0040998	0.2189314	0.0609957	0.0551375
0.0300	-0.0025695	-0.0044352	0.1796062	0.0481541	0.0836787
0.0200	-0.0020601	-0.0039799	0.1306210	0.0336001	0.1394213
0.0100	-0.0012086	-0.0025656	0.0709203	0.0172233	0.2441510
0.0000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Table 3. Vorticity across various horizontal planes including the lid (Y=1)

x	y = 0.05	y = 0.1	y = 0.5	y = 0.9	y = 0.95	y = 1
1.0000	-0.17929	-0.60926	5.46216	54.40536	83.82035	-
0.9900	-0.17375	-0.47741	6.86551	33.66726	57.81025	-193.0732
0.9800	-0.16283	-0.35504	7.93810	9.41625	28.93863	-105.2682
0.9700	-0.14989	-0.24119	8.43172	-6.98776	-12.58720	-76.18741
0.9688	-0.14832	-0.22802	8.44350	-8.09234	-18.69105	-73.88780
0.9609	-0.13815	-0.14355	8.24616	-11.64291	-18.32549	-61.97943
0.9531	-0.12866	-0.06309	7.58524	-11.40885	-15.20862	-53.75680
0.9453	-0.11967	0.01560	6.50867	-10.12014	-12.89386	-47.57332
0.9063	-0.06208	0.42148	-0.92291	-5.83800	-11.48036	-30.44597
0.8594	0.13146	1.02102	-3.43016	-3.82457	-8.64711	-22.02932
0.8047	0.60407	1.81340	-2.21171	-2.75787	-7.40476	-17.96185
0.6800	1.83647	2.61276	-2.05076	-1.72033	-5.61582	-14.63945
0.5000	2.54142	1.67369	-2.06722	-1.17266	-4.16691	-14.75343
0.3500	2.43774	1.97950	-2.08206	-0.56336	-2.77107	-21.90303
0.2344	1.17557	1.85753	-2.06122	0.52638	-1.79633	-33.94041
0.2266	1.08721	1.79535	-2.00174	0.62687	-1.73873	-34.93415
0.1563	0.46012	1.11722	-0.74207	1.61914	-1.20497	-44.90023
0.0938	0.17419	0.60202	0.82398	2.19694	-0.33969	-58.36012
0.0781	0.12426	0.48122	1.23991	2.19872	0.02007	-64.21606
0.0703	0.10014	0.41877	1.50306	2.17276	0.22391	-67.99358
0.0625	0.07594	0.35376	1.83308	2.13035	0.44502	-72.63798
0.0400	0.00306	0.14669	3.33658	1.95391	1.27700	-95.39030
0.0300	-0.03138	0.04311	4.29135	1.88346	1.97216	-115.6894
0.0200	-0.06686	-0.06878	5.37260	1.83702	3.32707	-154.8781
0.0100	-0.10286	-0.18986	6.51241	1.79654	5.88274	-266.9197
0.0000	-0.13883	-0.32125	7.66368	1.68707	9.42476	-

Table 4. Horizontal velocity across various vertical planes

y	x = 0.05	x = 0.1	x = 0.5	x = 0.9	x = 0.95
1.0000	1.0000000	1.0000000	1.0000000	1.0000000	1.0000000
0.9900	0.3065653	0.4887094	0.8489396	0.7776734	0.6484320
0.9800	-0.0005934	0.1589376	0.7070189	0.6278671	0.4540469
0.9766	-0.0463677	0.0877266	0.6644227	0.5858239	0.4050784
0.9688	-0.0963229	-0.0179216	0.5808359	0.5012384	0.3138397
0.9609	-0.1069008	-0.0685061	0.5169277	0.4290510	0.2435656
0.9531	-0.1011555	-0.0861188	0.4723329	0.3685037	0.1898196
0.8516	0.0021425	0.0275091	0.3372212	0.0595013	-0.0235823
0.7344	0.0225256	0.0682270	0.1886747	-0.0072932	-0.0423034
0.6172	0.0208341	0.0429384	0.0570178	-0.0595876	-0.0535559
0.5000	-0.0006440	-0.0137569	-0.0620561	-0.1283646	-0.0633121
0.4531	-0.0113844	-0.0381231	-0.1081999	-0.1514129	-0.0588011
0.2813	-0.0297568	-0.0836295	-0.2803696	-0.0800951	-0.0130228
0.1719	-0.0126154	-0.0437264	-0.3885690	-0.0145998	-0.0008423
0.1016	-0.0009820	-0.0100382	-0.3004561	0.0102124	0.0053608
0.0703	0.0019072	-0.0000785	-0.2228955	0.0171827	0.0069668
0.0625	0.0023343	0.0016359	-0.2023300	0.0178619	0.0069736
0.0547	0.0026292	0.0029984	-0.1812881	0.0179832	0.0067790
0.0400	0.0027887	0.0045171	-0.1396601	0.0165065	0.0058251
0.0300	0.0025658	0.0046801	-0.1090870	0.0141215	0.0047386
0.0200	0.0020422	0.0040486	-0.0759628	0.0105719	0.0033397
0.0100	0.0011932	0.0025269	-0.0397486	0.0058570	0.0017139
0.0000	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Table 5. Vorticity across various vertical planes including the right wall (X=1)

y	x = 0.05	x = 0.1	x = 0.5	x = 0.9	x = 0.95	x = 1
1.0000	-82.88530	-56.49430	-14.75343	-28.82785	-51.10558	-
0.9900	-50.20259	-43.09178	-15.05290	-17.74513	-25.54681	221.8440
0.9800	-18.68297	-24.13193	-13.07933	-13.40918	-17.86904	143.1081
0.9766	-12.82039	-18.91754	-12.06700	-12.48652	-16.51062	130.2276
0.9688	-4.96803	-9.96557	-9.49495	-10.87466	-14.45508	109.9641
0.9609	-1.29528	-4.41087	-6.95966	-9.67139	-13.22588	96.54065
0.9531	0.43762	-1.27242	-4.85753	-8.73535	-12.46865	86.96993
0.8516	2.07528	2.31296	-1.76199	-4.56083	-9.02843	40.38086
0.7344	3.12247	1.92293	-2.09121	-4.50244	-1.10833	23.99839
0.6172	3.34698	0.95006	-2.06539	-4.39615	4.53833	14.09384
0.5000	2.55549	0.67694	-2.06722	-1.79307	7.20269	5.46216
0.4531	2.23733	0.75949	-2.06215	0.39819	6.96076	2.86413
0.2813	1.40410	1.43662	-2.26772	3.85521	1.65939	-0.85316
0.1719	0.69823	1.22753	-1.05466	1.17966	0.14495	-0.88987
0.1016	0.25090	0.66334	1.63436	0.50807	-0.02903	-0.62090
0.0703	0.11070	0.38030	2.20175	0.19305	-0.08504	-0.35885
0.0625	0.08101	0.30944	2.31786	0.10347	-0.10040	-0.28808
0.0547	0.05273	0.23825	2.44960	0.01053	-0.11587	-0.21903
0.0400	0.00178	0.10202	2.77658	-0.16980	-0.14352	-0.10259
0.0300	-0.03228	0.00653	3.06857	-0.29277	-0.15926	-0.04175
0.0200	-0.06657	-0.09265	3.40784	-0.41312	-0.17036	-0.00325
0.0100	-0.10145	-0.19683	3.77731	-0.52936	-0.17460	0.00765
0.0000	-0.13705	-0.30734	4.16648	-0.64177	-0.16983	-

Table 6. Extrema of the velocity through the centerlines of the cavity

u_{min}	y_{min}	v_{max}	x_{max}	v_{min}	x_{min}
-0.3885698	0.1716968	0.3769447	0.1578365	-0.5270773	0.9092470

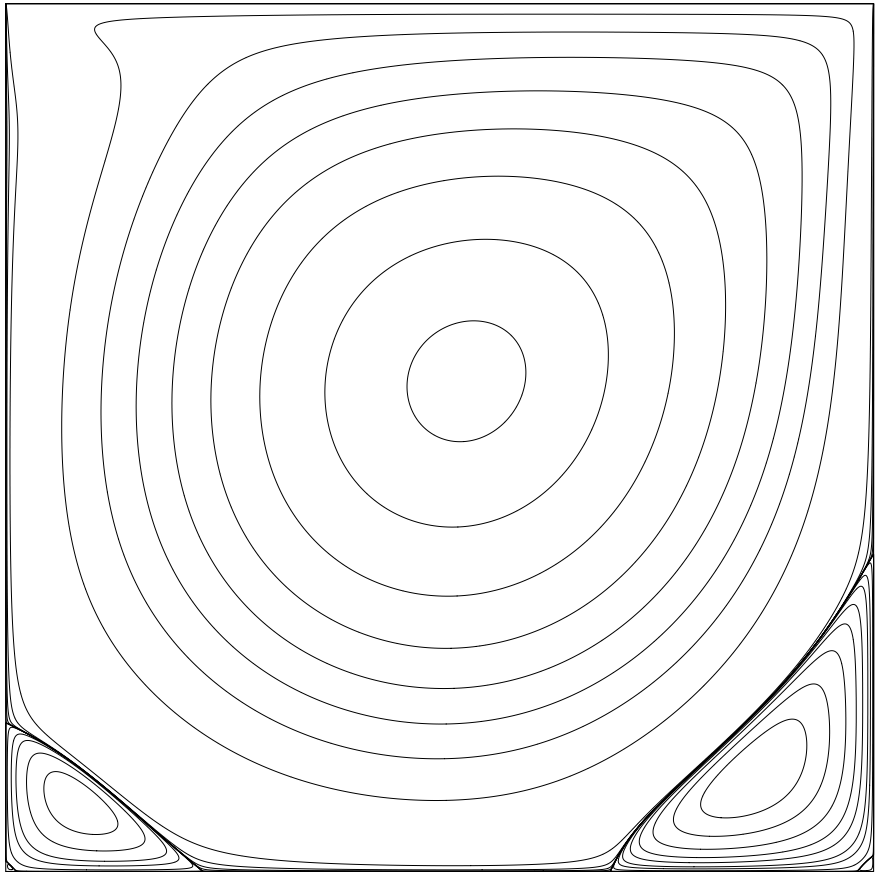

Figure 1. Streamlines, manual levels.

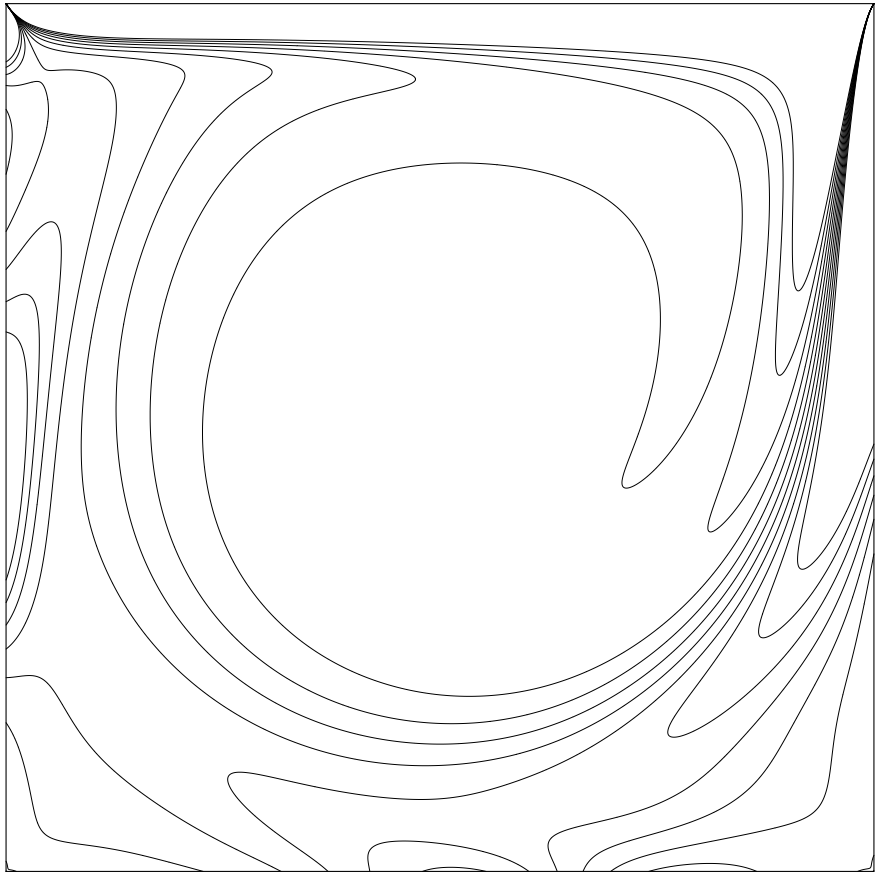

Figure 2. Vorticity contours, levels from -5 to 5 with step 1.