MEEN 673

Final Exam

Jicheng Lu

525004048

Problem 4:

Table 4.1 center deflection versus load.

Load, q	N=0, EBT	N=1, EBT	N=5, EBT	N=0, TBT	N=1, TBT	N=5, TBT
5	0.08310	0.09459	0.12365	0.08316	0.09475	0.12379
10	0.10957	0.12548	0.16325	0.10992	0.12584	0.16392
15	0.12759	0.14674	0.19053	0.12787	0.14705	0.19122
20	0.14171	0.16353	0.21213	0.14198	0.16384	0.21287
25	0.15344	0.17763	0.23029	0.15378	0.17795	0.23109
30	0.16372	0.18981	0.24570	0.16403	0.19025	0.24698
35	0.17286	0.20062	0.25986	0.17315	0.20122	0.26116
40	0.18104	0.21058	0.27271	0.18140	0.21116	0.27404
45	0.18864	0.21972	0.28452	0.18871	0.22030	0.28586
50	0.19568	0.22820	0.29546	0.19574	0.22847	0.29645
55	0.20225	0.23612	0.30569	0.20230	0.23640	0.30672
60	0.20842	0.24356	0.31531	0.20847	0.24386	0.31639
65	0.21424	0.25060	0.32440	0.21429	0.25091	0.32553
70	0.21977	0.25727	0.33303	0.21981	0.25760	0.33420
75	0.22503	0.26363	0.34126	0.22507	0.26397	0.34247
80	0.23006	0.26972	0.34912	0.23010	0.27006	0.35037
85	0.23488	0.27555	0.35666	0.23491	0.27590	0.35795
90	0.23951	0.28115	0.36391	0.23954	0.28151	0.36523
95	0.24397	0.28655	0.37090	0.24399	0.28692	0.37224
100	0.24827	0.29176	0.37764	0.24828	0.29214	0.37902

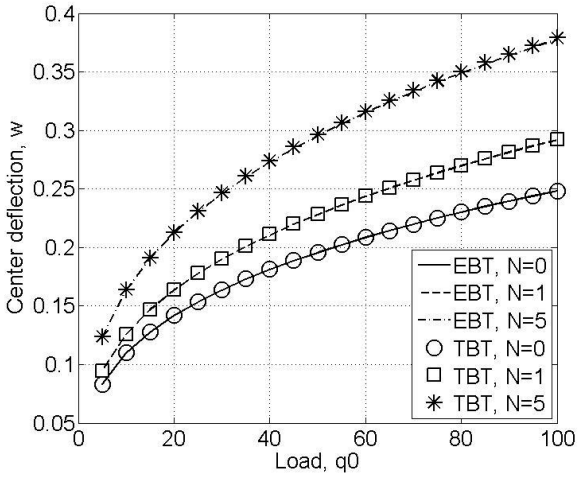

Figure4.1 center deflection versus load.

Problem 5:

Table 5.1 Horizontal velocity $v_x(0.5, y)$ versus y

y	U (Re=0)	U (Re=5000)	U (Re=10000)
0.00000	0	0.00000	0.00000
0.03125	-0.01961	-0.11342	-0.08989
0.06250	-0.036587	-0.16710	-0.12346
0.09375	-0.051763	-0.19148	-0.13295
0.12500	-0.065674	-0.19086	-0.12617
0.18750	-0.091198	-0.16045	-0.10237
0.25000	-0.11514	-0.12011	-0.08039
0.31250	-0.13828	-0.10523	-0.06781
0.37500	-0.16002	-0.06793	-0.04189
0.43750	-0.17854	-0.04248	-0.02609
0.50000	-0.18992	-0.01197	-0.00524
0.56250	-0.18839	0.01816	0.01439
0.62500	-0.1649	0.04843	0.03422
0.68750	-0.1085	0.08473	0.05894
0.75000	-0.0057853	0.11519	0.07998
0.81250	0.15435	0.15854	0.10541
0.87500	0.3792	0.19200	0.13379
0.90625	0.51533	0.19896	0.12905
0.93750	0.66614	0.18633	0.13085
0.96875	0.82884	0.25124	0.13665
1.00000	1. 00000	1.00000	1.00000

Table 5.2 Pressure P(x, 0.15625) versus x

x	P (Re=5000)	P (Re=10000)
0.015625	44.6380	34.2010
0.046875	49.5530	48.2380
0.078125	44.1740	33.6690
0.109380	48.9330	47.6750
0.156250	43.7240	36.1030
0.218750	41.4340	38.7510
0.281250	27.5270	20.1770
0.343750	16.4050	14.1050
0.437500	1.2502	-3.6203
0.562500	1.4209	-1.4493
0.656250	10.1760	2.6343
0.718750	24.5130	20.9200
0.781250	31.4970	24.9360
0.843750	38.7890	39.5750
0.890620	35.5010	29.9010
0.921880	41.9170	44.8940
0.953120	34.6050	29.4000
0.984380	42.3150	45.2000

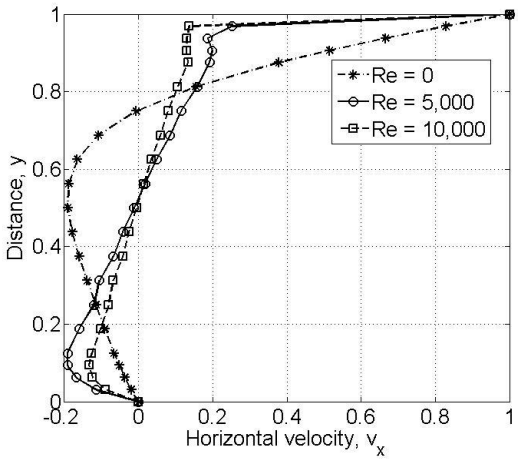

Figure 5.1 $v_x(0.5, y)$ versus y

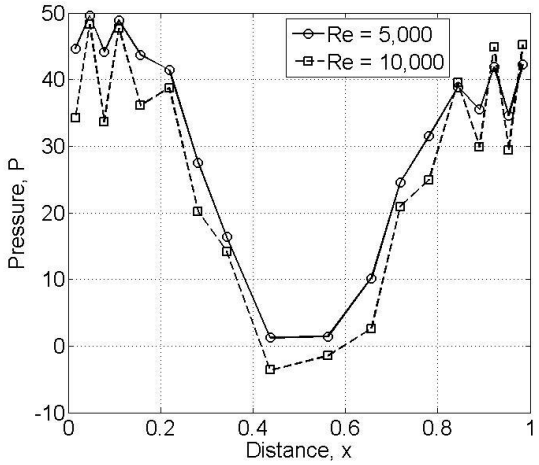

Figure 5.2 P(x, 0.15625) versus x

Problem 6:

Table 6.1 Displacement of node 22.

Load step	-y	-v
1	-0.1817	0.3183
2	0.0671	0.5671
3	0.2584	0.7584
4	0.4135	0.9135
5	0.5447	1.0447
6	0.6600	1.1600
7	0.7631	1.2631
8	0.8571	1.3571
9	0.9439	1.4439
10	1.0248	1.5248
11	1.1010	1.6010
12	1.1731	1.6731
13	1.2418	1.7418
14	1.3075	1.8075
15	1.3706	1.8706
16	1.4314	1.9314
17	1.4901	1.9901
18	1.5471	2.0471
19	1.6025	2.1025
20	1.6563	2.1563
21	1.7089	2.2089
22	1.7602	2.2602
23	1.8104	2.3104
24	1.8596	2.3596
25	1.9078	2.4078
26	1.9552	2.4552
27	2.0018	2.5018
28	2.0476	2.5476
29	2.0927	2.5927
30	2.1372	2.6372
31	2.1811	2.6811

Table 6.2 Stress at Gauss point closest to (0,b).

load	x	y	sigma xx	x	y	Sxx
1	0.4256	0.7847	0.5126	0.4227	0.7887	0.5235
2	0.4284	0.7809	0.9840	0.4227	0.7887	1.0258
3	0.4309	0.7775	1.3902	0.4227	0.7887	1.4778
4	0.4331	0.7743	1.7452	0.4227	0.7887	1.8901
5	0.4352	0.7712	2.0616	0.4227	0.7887	2.2731
6	0.4371	0.7682	2.3495	0.4227	0.7887	2.6368
7	0.4389	0.7653	2.6134	0.4227	0.7887	2.9842
8	0.4406	0.7624	2.8578	0.4227	0.7887	3.3196
9	0.4422	0.7596	3.0859	0.4227	0.7887	3.6457
10	0.4438	0.7569	3.2998	0.4227	0.7887	3.9644
11	0.4453	0.7541	3.5014	0.4227	0.7887	4.2773
12	0.4468	0.7514	3.6920	0.4227	0.7887	4.5856
13	0.4482	0.7487	3.8726	0.4227	0.7887	4.8902
14	0.4496	0.7461	4.0444	0.4227	0.7887	5.1919
15	0.4510	0.7435	4.2080	0.4227	0.7887	5.4913
16	0.4523	0.7409	4.3641	0.4227	0.7887	5.7891
17	0.4536	0.7383	4.5132	0.4227	0.7887	6.0856
18	0.4549	0.7357	4.6560	0.4227	0.7887	6.3814
19	0.4562	0.7331	4.7927	0.4227	0.7887	6.6766
20	0.4575	0.7305	4.9238	0.4227	0.7887	6.9718
21	0.4587	0.7280	5.0496	0.4227	0.7887	7.2670
22	0.4599	0.7254	5.1704	0.4227	0.7887	7.5625
23	0.4611	0.7229	5.2866	0.4227	0.7887	7.8587
24	0.4623	0.7204	5.3983	0.4227	0.7887	8.1555
25	0.4635	0.7179	5.5058	0.4227	0.7887	8.4534
26	0.4647	0.7154	5.6092	0.4227	0.7887	8.7523
27	0.4658	0.7128	5.7088	0.4227	0.7887	9.0524
28	0.4670	0.7103	5.8048	0.4227	0.7887	9.3540
29	0.4681	0.7079	5.8973	0.4227	0.7887	9.6570
30	0.4693	0.7054	5.9864	0.4227	0.7887	9.9616
31	0.4704	0.7029	6.0724	0.4227	0.7887	10.2680
32	0.4715	0.7004	6.1552	0.4227	0.7887	10.5760

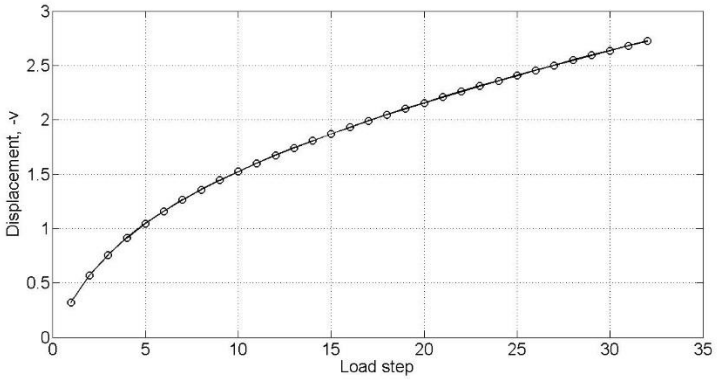

Figure 6.1 Displacement, –v, versus load (UL formulation)

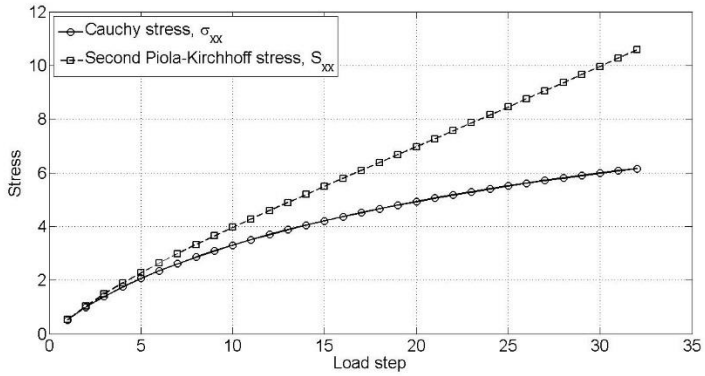

Figure 6.2 Stress versus load (UL formulation)