Linear Analysis of Bernoulli Beams

Bence Balogh

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1 Input Data

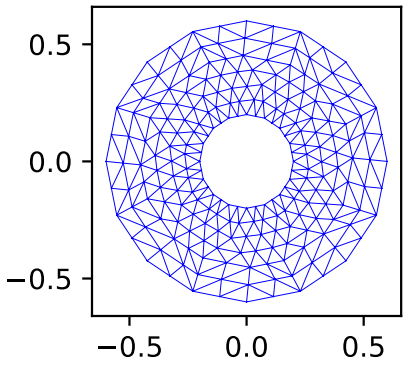

Figure 1: Mesh of the cross section.

E	ν	A	I_x	I_y	I_z
2.1e+04	0.25	0.9797	0.191	0.09548	0.09548

Table 1: Section properties.

2 Results

index	name	U_x	U_y	U_z	φ_x	φ_y	φ_z
0	LC1	-1.486e-18	7.391e-15	0.9151	-9.688e-15	-0.002003	1.798e-17
1	LC2	-0.01078	0.9154	-1.012e-13	-1.187e-14	4.153e-17	0.003603
2	LC3	-0.01078	-0.9154	-7.672e-14	1.19e-14	-6.839e-18	-0.003603

Table 2: DOF solutions of loaded nodes for each load case.

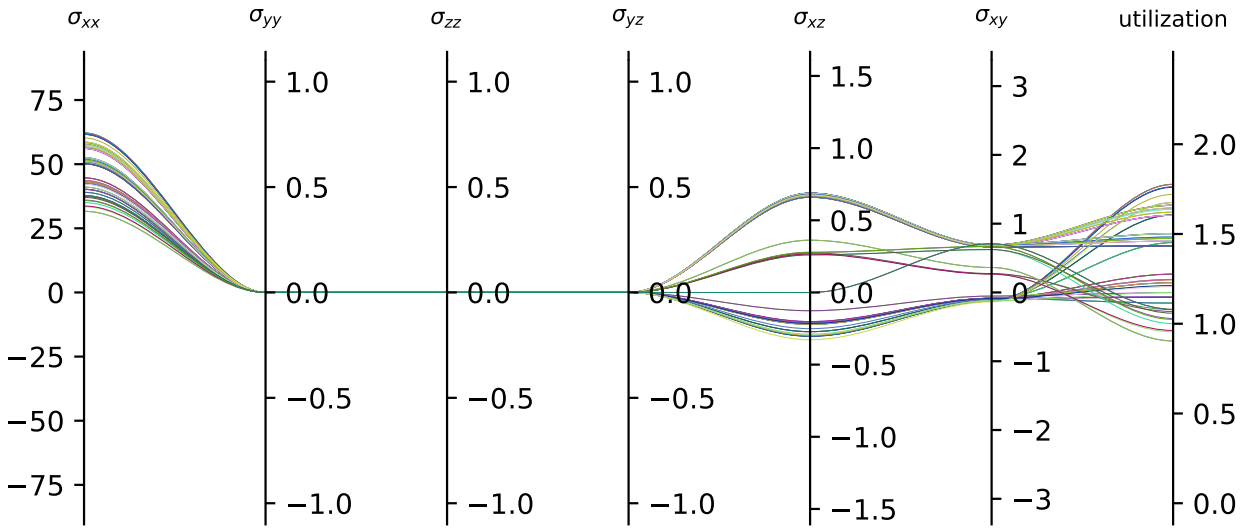

Figure 2: Stresses for several points.

The maximum utilization occurs at element 26, from load case 0 at location −1.

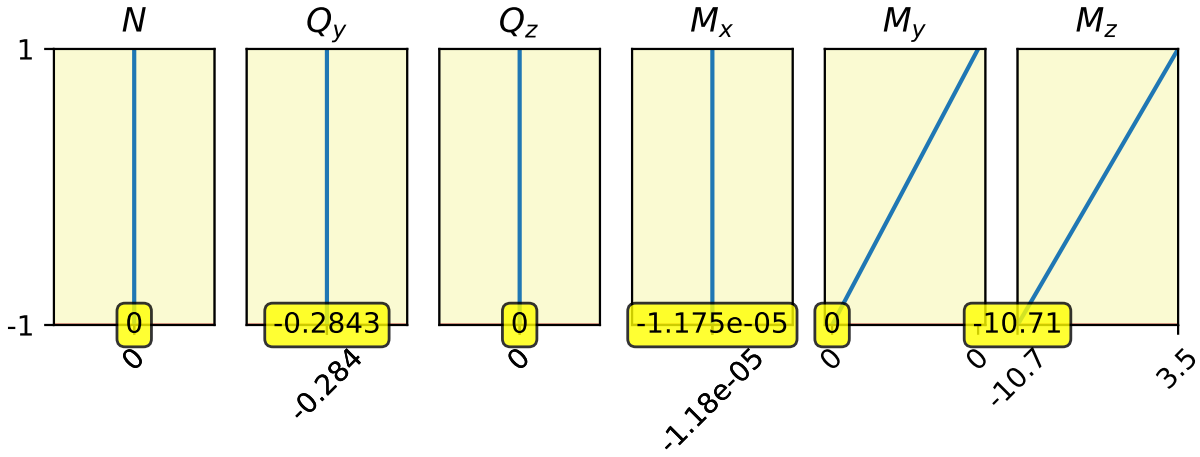

Figure 3: Internal forces for element 26.

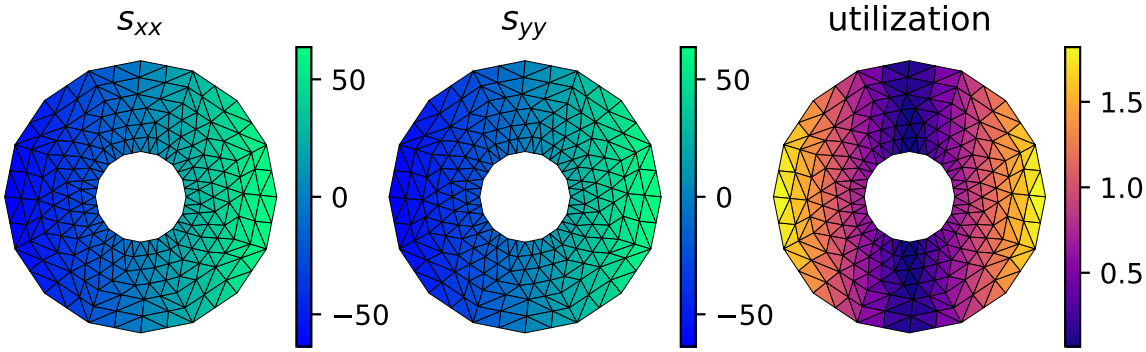

Figure 4: Results of a cross section.

3 Appendix

index	U_x	U_y	U_z	φ_x	φ_y	φ_z
0	3.83e-12	1.876e-17	2.062e-13	8.459e-19	-2.927e-12	1.564e-16
1	3.299e-26	1.177e-27	2.543e-13	-6.497e-19	-3.328e-12	1.698e-26
2	-3.83e-12	-1.876e-17	2.062e-13	8.459e-19	-2.927e-12	-1.564e-16
3	3.838e-12	-2.041e-26	2.062e-13	-1.331e-25	-2.926e-12	-2.627e-25
4	-4.221e-28	1.465e-27	2.543e-13	-1.331e-25	-3.328e-12	1.938e-26
5	-3.838e-12	2.334e-26	2.062e-13	-1.332e-25	-2.926e-12	3.015e-25
6	3.83e-12	-1.876e-17	2.062e-13	-8.459e-19	-2.927e-12	-1.564e-16
7	-3.307e-26	1.178e-27	2.543e-13	6.497e-19	-3.328e-12	1.699e-26

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index	U_x	U_y	U_z	φ_x	φ_y	φ_z
8	-3.83e-12	1.876e-17	2.062e-13	-8.459e-19	-2.927e-12	1.564e-16
9	0.004654	1.485e-08	0.1883	1.318e-08	-0.004357	-9.733e-07
10	4.009e-17	1.118e-15	0.1883	-1.013e-08	-0.001855	2.834e-17
11	-0.004654	-1.485e-08	0.1883	1.318e-08	-0.004357	9.733e-07
12	0.004664	-1.443e-14	0.1883	-2.077e-15	-0.004357	-9.376e-17
13	-5.13e-19	1.118e-15	0.1883	-2.078e-15	-0.001855	1.335e-17
14	-0.004664	1.667e-14	0.1883	-2.076e-15	-0.004357	1.206e-16
15	0.004654	-1.485e-08	0.1883	-1.318e-08	-0.004357	9.733e-07
16	-4.019e-17	1.118e-15	0.1883	1.013e-08	-0.001855	2.829e-17
17	-0.004654	1.485e-08	0.1883	-1.318e-08	-0.004357	-9.733e-07
18	0.008015	4.073e-08	0.4273	5.18e-07	-0.004822	-2.126e-06
19	7.177e-17	2.789e-15	0.4273	-1.933e-07	-0.00249	4.239e-17
20	-0.008015	-4.073e-08	0.4273	5.18e-07	-0.004822	2.126e-06
21	0.008037	-3.044e-14	0.4272	-4.438e-15	-0.004822	-1.023e-16
22	-8.698e-19	2.789e-15	0.4272	-4.422e-15	-0.002493	2.168e-17
23	-0.008037	3.606e-14	0.4272	-4.437e-15	-0.004822	1.454e-16
24	0.008015	-4.073e-08	0.4273	-5.18e-07	-0.004822	2.126e-06
25	-7.176e-17	2.788e-15	0.4273	1.933e-07	-0.00249	4.191e-17
26	-0.008015	4.073e-08	0.4273	-5.18e-07	-0.004822	-2.126e-06
27	0.01003	2.001e-06	0.6756	2.186e-05	-0.005063	-3.136e-06
28	9.075e-17	5.318e-15	0.6756	3.7e-06	-0.002679	4.819e-17
29	-0.01003	-2.001e-06	0.6756	2.186e-05	-0.005063	3.136e-06
30	0.01007	-4.79e-14	0.6757	-7.089e-15	-0.005101	-1.011e-16
31	-1.062e-18	5.319e-15	0.6757	-7.092e-15	-0.002701	2.499e-17
32	-0.01007	5.846e-14	0.6757	-7.084e-15	-0.005101	1.511e-16
33	0.01003	-2.001e-06	0.6756	-2.186e-05	-0.005063	3.136e-06
34	-9.151e-17	5.322e-15	0.6756	-3.7e-06	-0.002679	4.857e-17
35	-0.01003	2.001e-06	0.6756	-2.186e-05	-0.005063	-3.136e-06
36	0.01073	5.105e-05	0.9097	0.0004588	-0.003552	-5.372e-06
37	9.628e-17	7.385e-15	0.9097	0.0002107	-0.00198	3.111e-17
38	-0.01073	-5.105e-05	0.9097	0.0004588	-0.003552	5.372e-06
39	0.01077	-6.471e-14	0.9149	-9.722e-15	-0.003597	-3.712e-17
40	-1.486e-18	7.391e-15	0.9151	-9.688e-15	-0.002003	1.798e-17
41	-0.01077	7.938e-14	0.9149	-9.684e-15	-0.003597	7.339e-17
42	0.01073	-5.105e-05	0.9097	-0.0004588	-0.003552	5.372e-06
43	-9.762e-17	7.399e-15	0.9097	-0.0002107	-0.00198	3.137e-17
44	-0.01073	5.105e-05	0.9097	-0.0004588	-0.003552	-5.372e-06