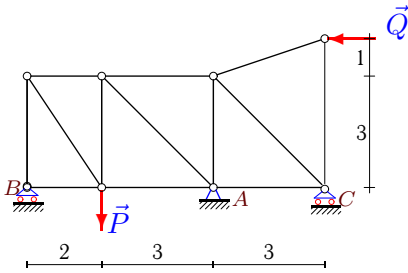


Расчет статически неопределимой фермы

Найти реакции опор фермы.

Задача M8.1.

3

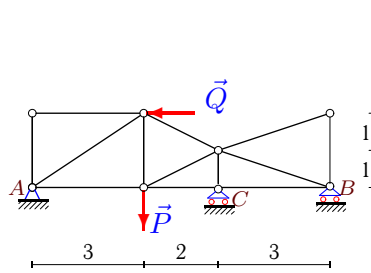


$$P = 5 \text{ кН},$$

$$Q = 4 \text{ кН}.$$

Задача M8.2.

3

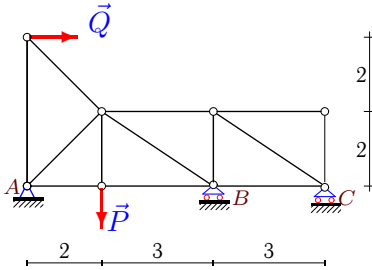


$$P = 13 \text{ кН},$$

$$Q = 6 \text{ кН}.$$

Задача M8.3.

3

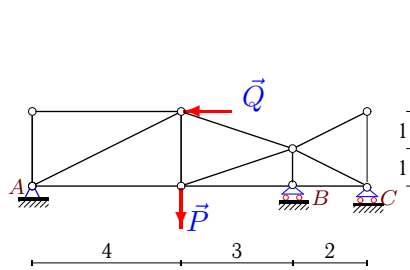


$$P = 7 \text{ кН},$$

$$Q = 8 \text{ кН}.$$

Задача M8.4.

3

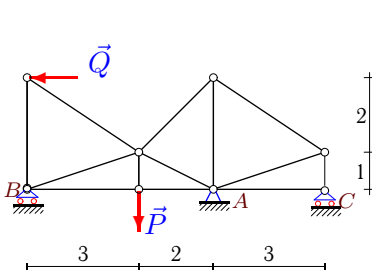


$$P = 10 \text{ кН},$$

$$Q = 3 \text{ кН}.$$

Задача M8.5.

3

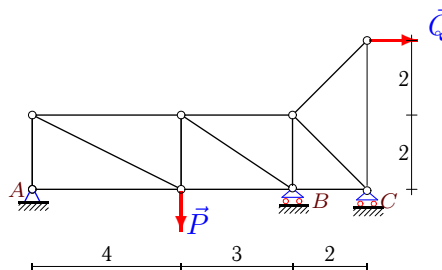


$$P = 5 \text{ кН},$$

$$Q = 5 \text{ кН}.$$

Задача M8.6.

3

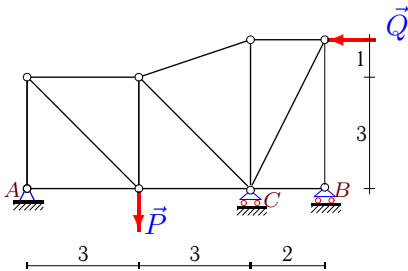


$$P = 12 \text{ кН},$$

$$Q = 9 \text{ кН}.$$

Задача M8.7.

3

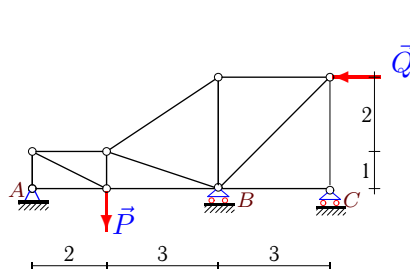


$$P = 10 \text{ кН},$$

$$Q = 6 \text{ кН}.$$

Задача M8.8.

3

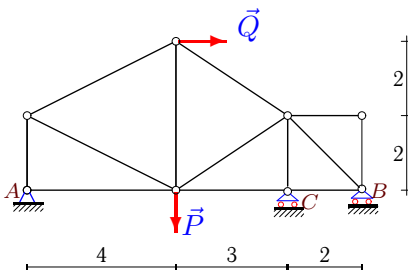


$$P = 12 \text{ кН},$$

$$Q = 8 \text{ кН}.$$

Задача M8.9.

3

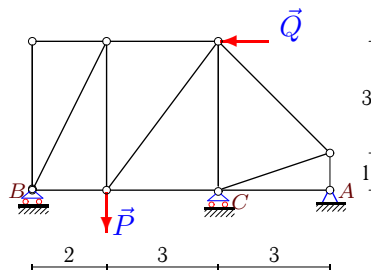


$$P = 9 \text{ кН},$$

$$Q = 4 \text{ кН}.$$

Задача M8.10.

3

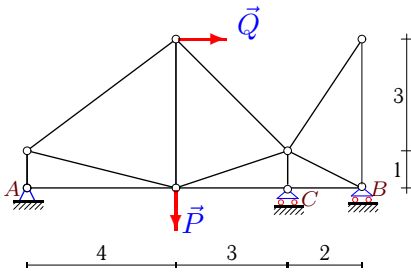


$$P = 9 \text{ кН},$$

$$Q = 7 \text{ кН}.$$

Задача M8.11.

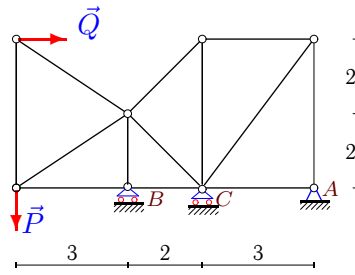
3



$P = 8 \text{ кН},$
 $Q = 6 \text{ кН}.$

Задача M8.12.

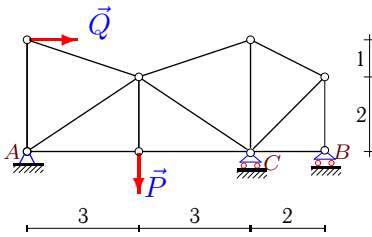
3



$P = 12 \text{ кН},$
 $Q = 6 \text{ кН}.$

Задача M8.13.

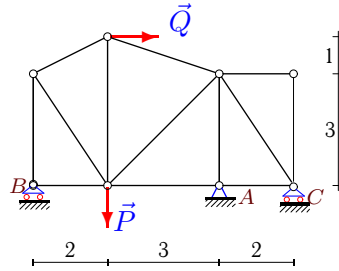
3



$P = 6 \text{ кН},$
 $Q = 4 \text{ кН}.$

Задача M8.14.

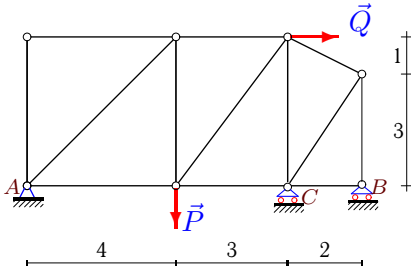
3



$P = 8 \text{ кН},$
 $Q = 4 \text{ кН}.$

Задача M8.15.

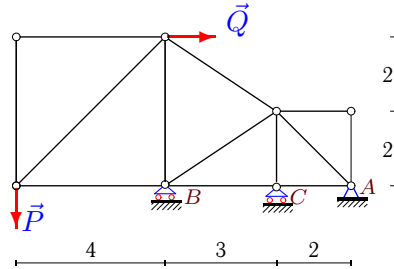
3



$P = 6 \text{ кН},$
 $Q = 3 \text{ кН}.$

Задача M8.16.

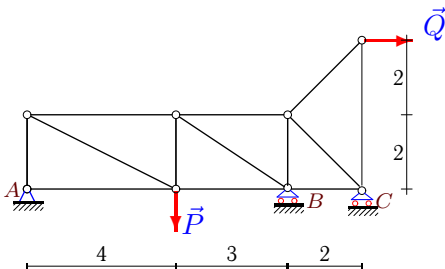
3



$P = 8 \text{ кН},$
 $Q = 5 \text{ кН}.$

Задача M8.17.

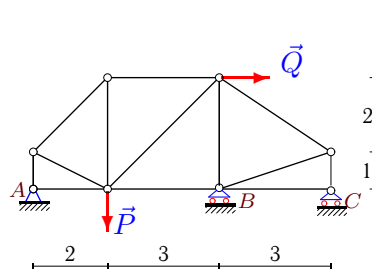
3



$P = 5 \text{ кН},$
 $Q = 9 \text{ кН}.$

Задача M8.18.

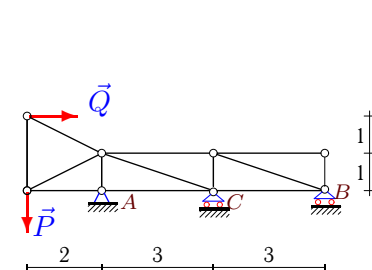
3



$P = 11 \text{ кН},$
 $Q = 3 \text{ кН}.$

Задача M8.19.

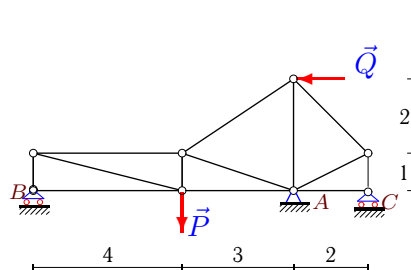
3



$P = 8 \text{ кН},$
 $Q = 3 \text{ кН}.$

Задача M8.20.

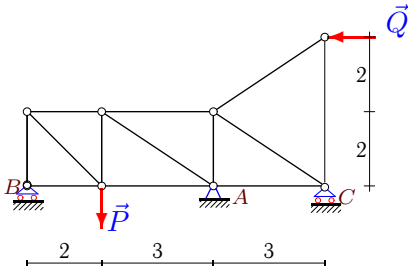
3



$P = 12 \text{ кН},$
 $Q = 8 \text{ кН}.$

Задача M8.21.

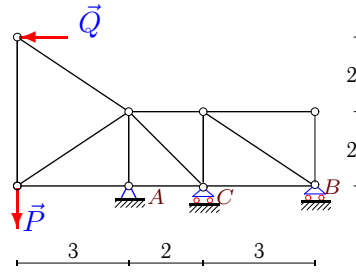
3



$P = 8 \text{ кН},$
 $Q = 4 \text{ кН}.$

Задача M8.22.

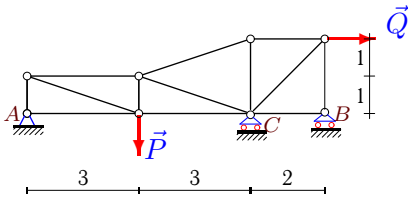
3



$P = 10 \text{ кН},$
 $Q = 4 \text{ кН}.$

Задача M8.23.

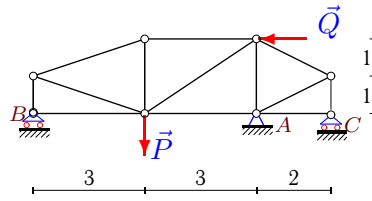
3



$P = 12 \text{ кН},$
 $Q = 7 \text{ кН}.$

Задача M8.24.

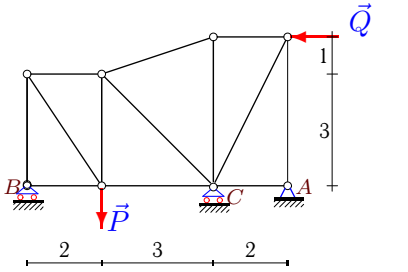
3



$P = 13 \text{ кН},$
 $Q = 4 \text{ кН}.$

Задача M8.25.

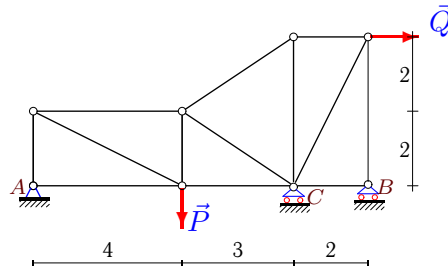
3



$P = 13 \text{ кН},$
 $Q = 7 \text{ кН}.$

Задача M8.26.

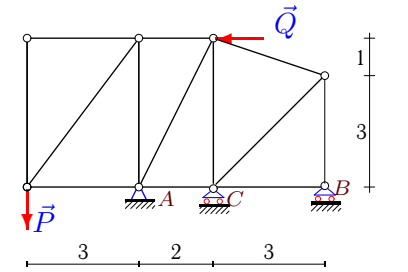
3



$P = 6 \text{ кН},$
 $Q = 7 \text{ кН}.$

Задача M8.27.

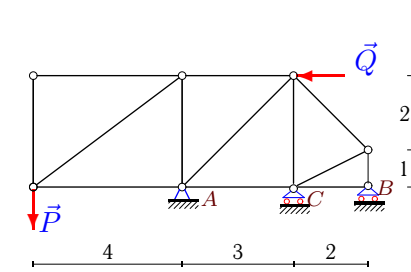
3



$P = 9 \text{ кН},$
 $Q = 3 \text{ кН}.$

Задача M8.28.

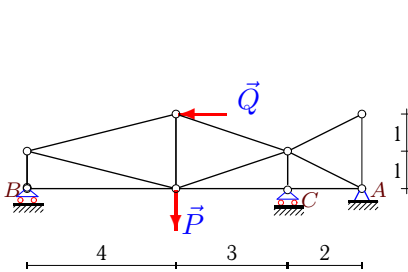
3



$P = 7 \text{ кН},$
 $Q = 5 \text{ кН}.$

Задача M8.29.

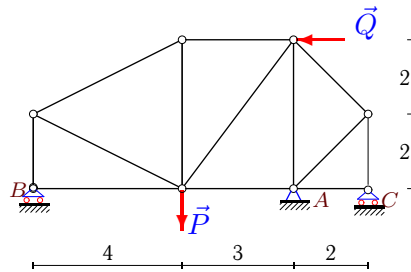
3



$P = 11 \text{ кН},$
 $Q = 8 \text{ кН}.$

Задача M8.30.

3



$P = 11 \text{ кН},$
 $Q = 9 \text{ кН}.$

М8 Ответы.**Расчет статически неопределимой фермы**

16.06.2012

	δ_{11}	Δ_{1P}	X_A	Y_A	Y_B	Y_C
1	25.375	78.384	4.000	3.742	4.347	-3.089
2	40.089	-255.786	6.000	7.232	-0.613	6.381
3	35.273	-3.598	-8.000	-2.139	9.037	0.102
4	44.736	28.533	3.000	4.961	5.677	-0.638
5	53.085	76.623	5.000	2.309	4.134	-1.443
6	18.051	-154.516	-9.000	2.446	0.994	8.560
7	7.645	-51.961	6.000	7.551	-4.347	6.796
8	33.112	290.473	8.000	6.737	14.036	-8.772
9	11.231	-68.171	-4.000	1.873	1.057	6.070
10	9.157	-48.855	7.000	-4.585	8.249	5.335
11	27.784	-206.811	-6.000	0.124	0.433	7.443
12	4.258	-6.233	-6.000	-2.985	13.522	1.464
13	6.295	-50.302	-4.000	0.252	-2.243	7.991
14	16.470	-44.939	-4.000	2.580	2.691	2.728
15	6.646	-23.594	-3.000	1.211	1.239	3.550
16	7.711	28.471	-5.000	-0.185	11.877	-3.692
17	18.051	-183.719	-9.000	-0.092	-5.086	10.178
18	23.262	-33.747	-3.000	5.670	3.879	1.451
19	29.811	41.000	-3.000	10.354	-0.979	-1.375
20	26.600	536.945	8.000	29.382	2.804	-20.186
21	36.713	146.001	4.000	6.363	5.614	-3.977
22	6.751	37.617	4.000	22.543	-6.971	-5.572
23	13.010	-171.373	-7.000	2.457	-3.629	13.173
24	14.955	46.035	4.000	9.271	6.807	-3.078
25	6.985	-49.643	7.000	-5.362	11.255	7.107
26	9.861	-39.400	-7.000	-0.666	2.670	3.996
27	5.712	-8.614	3.000	15.895	-8.403	1.508
28	5.470	-4.646	5.000	15.260	-9.110	0.849
29	26.809	-210.326	8.000	-2.991	6.145	7.845
30	10.088	55.743	9.000	8.247	8.278	-5.526

М8 файл о8т3А

В первой строке — усилия от действия основной нагрузки, во второй — от единичной вертикальной силы в опоре
С.

	U_1	U_2	U_3	V_1	V_2	V_3	V_4	O_1	O_2	O_3	D_1	D_2	D_3
1	0.000 0.000	4.133 0.400	1.333 1.000	-6.200 -0.600	-1.200 -0.600	0.000 1.000	1.333 0.000	-4.133 -0.400	-5.333 -1.000	-4.216 0.000	7.451 0.721	1.697 0.849	-1.886 -1.414
2	8.437 -0.562	10.125 -1.875	10.125 -1.875	-0.000 0.000	13.844 -0.656	0.000 -1.000	0.000 0.000	0.000 0.000	-9.433 0.629	0.000 -0.000	-17.352 0.676	-1.887 1.467	-10.673 1.976
3	13.800 0.600	13.800 0.600	0.000 1.500	8.000 0.000	7.000 0.000	0.000 1.000	0.000 0.000	-11.314 0.000	0.000 -1.500	0.000 0.000	-8.202 -0.849	-16.586 1.082	0.000 -1.803
4	7.286 0.571	0.000 2.000	0.000 2.000	0.000 0.000	7.571 0.476	-4.857 1.286	0.000 0.000	0.000 0.000	-7.680 -0.602	0.000 0.000	-11.500 -0.639	7.680 -1.506	0.000 -2.236
5	5.000 1.800	5.000 1.800	0.000 0.000	-3.333 0.000	5.000 0.000	0.000 1.667	0.000 -1.000	6.009 0.000	-0.000 -1.414	-0.000 -1.202	-5.270 -1.897	-0.000 -0.894	0.000 1.054
6	9.000 0.000	9.000 0.571	-9.000 1.000	-0.000 -0.286	12.000 -0.286	0.000 1.000	-9.000 0.000	0.000 -0.571	18.000 -1.000	12.728 0.000	0.000 0.639	-21.633 0.515	12.728 -1.414
7	-6.000 0.000	3.250 -0.250	0.000 0.000	-9.250 0.250	0.750 0.250	2.125 -0.125	-0.750 0.750	-9.250 0.250	-6.720 0.395	-6.375 0.375	13.081 -0.354	-4.066 -0.177	0.839 -0.839
8	-8.000 0.000	16.000 1.200	0.000 0.000	-12.000 -0.600	0.000 -0.600	5.333 0.667	0.000 -1.000	-24.000 -1.200	-9.615 -1.202	-8.000 -1.000	26.833 1.342	-16.865 -0.211	0.000 1.414
9	4.000 0.000	5.778 -0.778	5.778 -0.778	-3.222 0.222	6.426 -0.259	0.000 -1.000	0.000 0.000	-3.603 0.248	-8.680 -0.248	-0.000 -0.000	3.603 0.248	1.736 0.668	-8.171 1.100
10	5.125 -0.187	6.063 -0.469	7.000 0.000	0.000 0.000	10.250 -0.375	0.312 -0.844	1.250 0.625	0.000 0.000	-5.125 0.187	1.326 0.663	-11.460 0.419	-1.562 0.469	-0.988 -0.494
11	6.000 0.000	12.444 -1.556	12.444 -1.556	-1.778 0.222	9.111 -0.389	0.000 -1.000	-0.000 0.000	-2.222 0.278	-10.999 0.314	0.000 -0.000	1.832 -0.229	-4.919 1.405	-13.913 1.739
12	-12.000 0.000	-12.000 0.000	-6.000 0.000	4.000 0.000	-14.400 0.600	-1.800 -0.300	2.400 0.400	-7.211 0.000	2.546 0.424	1.800 0.300	14.422 -0.000	5.940 -0.424	-3.000 -0.500
13	9.375 -0.375	9.375 -0.375	-0.000 0.000	1.333 0.000	6.000 0.000	2.083 -0.417	-3.750 0.750	-4.216 0.000	-2.635 0.527	-2.795 0.559	-6.460 0.451	-8.263 -0.150	3.536 -0.707
14	0.000 0.000	-4.000 0.667	-0.000 0.667	-1.600 -0.400	2.000 0.167	-6.400 1.400	-0.000 0.000	-0.894 -0.224	-5.060 -0.211	0.000 -0.000	1.442 0.361	6.788 -0.660	0.000 -1.202
15	5.000 -0.222	2.000 -0.389	0.000 0.000	0.000 0.000	2.000 -0.222	-3.000 -0.417	-4.000 0.778	0.000 0.000	-2.000 0.222	-2.236 0.435	-2.828 0.314	5.000 0.278	3.606 -0.701
16	-8.000 0.000	-7.400 -0.600	-7.400 -0.600	-0.000 0.000	-10.000 0.000	0.000 -1.000	-0.000 0.000	0.000 0.000	3.606 0.000	0.000 0.000	11.314 0.000	-0.721 0.721	3.394 0.849
17	9.000 0.000	3.000 0.571	-9.000 1.000	3.000 -0.286	8.000 -0.286	0.000 1.000	-9.000 0.000	6.000 -0.571	18.000 -1.000	12.728 0.000	-6.708 0.639	-14.422 0.515	12.728 -1.414
18	3.000 0.000	0.000 1.000	-0.000 0.000	-4.800 -0.600	3.200 0.400	-6.200 1.267	0.000 -1.000	-4.525 -0.566	-3.200 -0.400	-0.000 -1.202	3.578 0.447	8.768 -0.849	0.000 1.054
19	-13.000 0.000	-10.000 0.000	-5.000 -1.500	1.500 0.000	-9.667 0.500	-1.667 -0.500	-0.000 0.000	-3.354 0.000	5.000 1.500	-0.000 0.000	14.534 -0.000	5.270 -1.581	5.270 1.581
20	0.000 0.000	34.286 1.143	0.000 0.000	-8.571 -0.286	3.429 -0.286	5.333 1.111	0.000 -1.000	-34.286 -1.143	-9.615 -0.801	0.000 -0.943	35.341 1.178	-27.708 -0.502	0.000 0.745
21	0.000 0.000	8.000 0.600	4.000 1.500	-8.000 -0.600	0.000 -0.600	0.000 1.000	2.667 0.000	-8.000 -0.600	-8.000 -1.500	-4.807 0.000	11.314 0.849	0.000 1.082	-4.807 -1.803
22	-19.000 0.000	-23.000 0.000	-13.800 -0.600	-2.667 0.000	-19.200 0.600	-9.200 -0.400	0.000 0.000	4.807 0.000	13.800 0.600	0.000 0.000	22.835 -0.000	13.011 -0.849	16.586 0.721
23	7.000 0.000	24.250 -0.750	0.000 -0.000	-5.750 0.250	6.250 0.250	-0.250 0.750	-6.250 0.750	-17.250 0.750	0.791 0.791	0.750 0.750	18.183 -0.791	-18.974 0.000	8.839 -1.061
24	0.000 0.000	4.000 1.000	0.000 -0.000	-7.833 -0.333	3.917 0.167	-5.167 0.833	0.000 -1.000	-12.386 -0.527	-11.750 -0.500	0.000 -1.118	12.386 0.527	9.314 -0.601	-0.000 1.118
25	0.000 0.000	8.857 -0.190	7.000 0.000	-13.286 0.286	-0.286 0.286	2.286 -0.119	0.286 0.714	-8.857 0.190	-7.228 0.376	-6.857 0.357	15.967 -0.343	-2.828 -0.236	-0.319 -0.799
26	7.000 0.000	7.444 -0.444	0.000 0.000	-0.222 0.222	5.778 0.222	-2.741 -0.259	-5.778 0.778	-0.444 0.444	4.941 0.467	4.111 0.389	0.497 -0.497	-5.475 0.067	6.460 -0.870
27	-6.750 0.000	-5.850 -0.300	-0.000 -0.000	0.000 0.000	-9.000 0.000	5.850 -0.700	7.800 0.400	0.000 0.000	6.750 0.000	6.166 0.316	11.250 0.000	-8.721 0.671	-8.273 -0.424
28	-9.333 -0.000	-5.733 -0.400	0.000 -0.000	0.000 -0.000	-7.000 -0.000	2.867 -0.800	8.600 0.600	0.000 0.000	9.333 0.000	8.108 0.566	11.667 0.000	-12.162 0.566	-6.410 -0.447
29	0.000 0.000	14.222 -1.556	14.222 -1.556	-7.889 0.222	6.537 -0.259	0.000 -1.000	-0.000 0.000	-16.263 0.458	-8.198 0.468	-0.000 -0.000	16.263 -0.458	1.640 1.171	-6.957 1.739
30	0.000 0.000	9.000 0.500	0.000 -0.000	-9.857 -0.286	4.929 0.143	-1.143 0.786	0.000 -1.000	-11.021 -0.319	-9.857 -0.286	0.000 -0.707	11.021 0.319	1.429 -0.357	-0.000 0.707