

Пространственная ферма

Найти усилия в стержнях 1–6 пространственной фермы, нагруженной в одном узле вертикальной силой \vec{G} и горизонтальной \vec{F} . Ответ выразить в кН.

Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2002.– 384 с. (с.86.)

Задача 11.1. 8

$G = 12 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.2. 8

$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.3. 8

$G = 13 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.4. 8

$G = 5 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 3 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.5. 8

$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.6. 8

$G = 5 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.7. 8

$G = 13 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

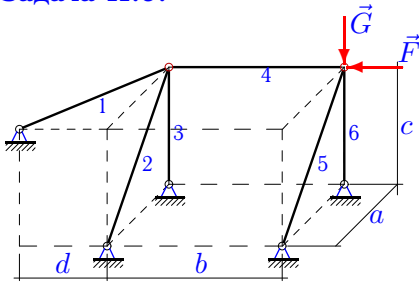
Задача 11.8. 8

$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.9.

8

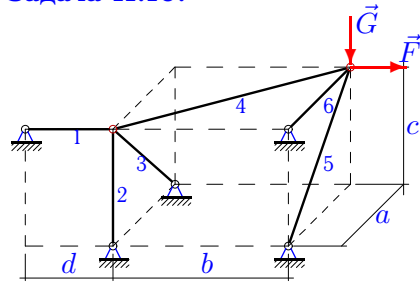


$G = 9 \text{ кН},$
 $F = 4 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.10.

8

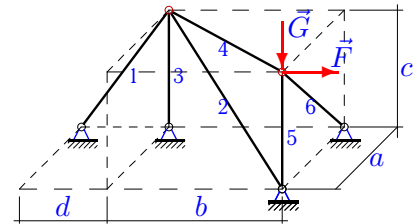


$G = 6 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.11.

8

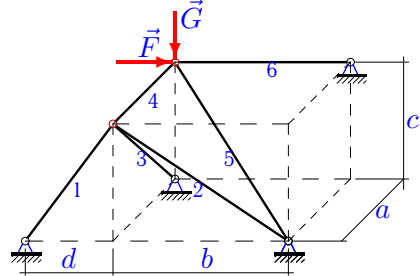


$G = 10 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.12.

8

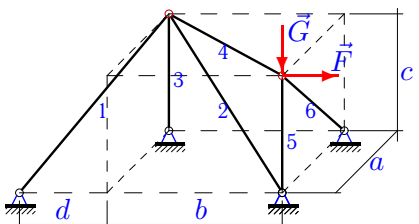


$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.13.

8

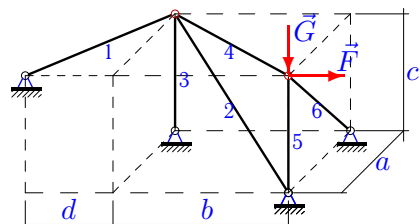


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.14.

8

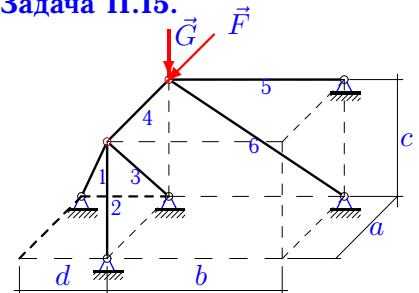


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.15.

8

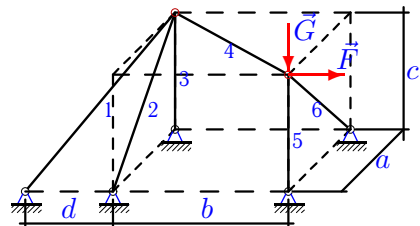


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.16.

8

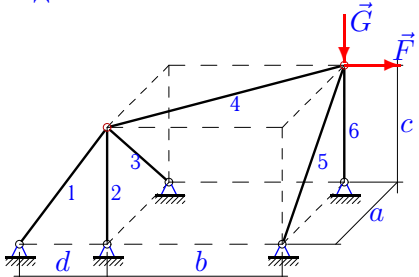


$G = 12 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.17.

8

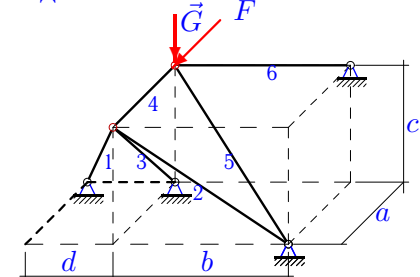


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.18.

8

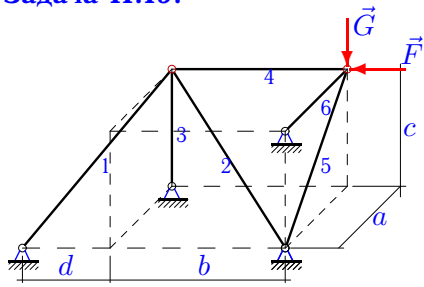


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 3 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.19.

8

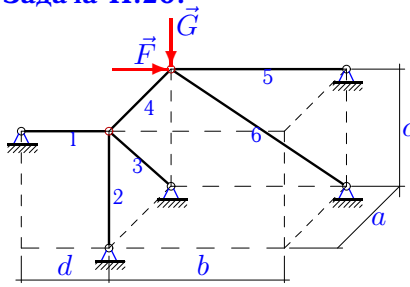


$G = 10 \text{ кН},$
 $F = 8 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.20.

8

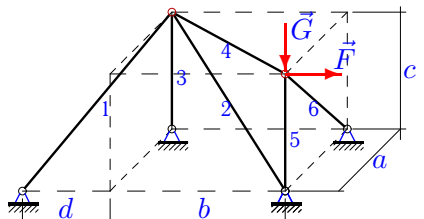


$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.21.

8

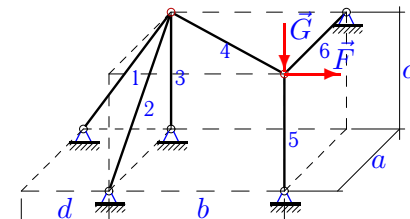


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.22.

8

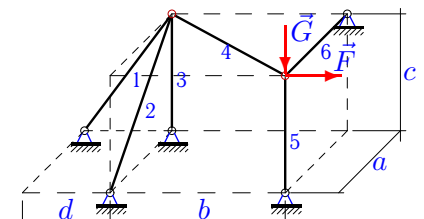


$G = 5 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.23.

8

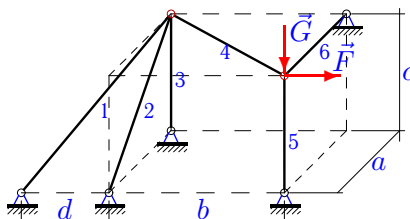


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 5 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.24.

8

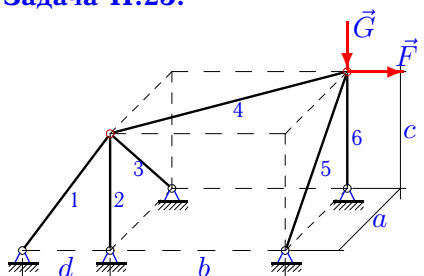


$G = 3 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 2 \text{ м}, b = 3 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.25.

8

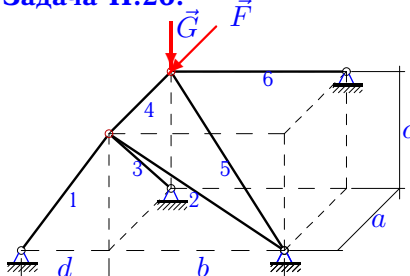


$G = 11 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 3 \text{ м}.$

Задача 11.26.

8

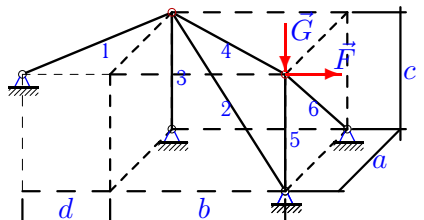


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 7 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.27.

8

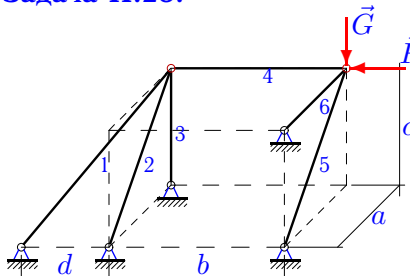


$G = 12 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 6 \text{ м}, b = 5 \text{ м}, c = 4 \text{ м}, d = 2 \text{ м}.$

Задача 11.28.

8

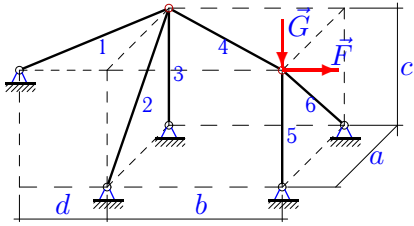


$G = 5 \text{ кН},$
 $F = 4 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Задача 11.29.

8

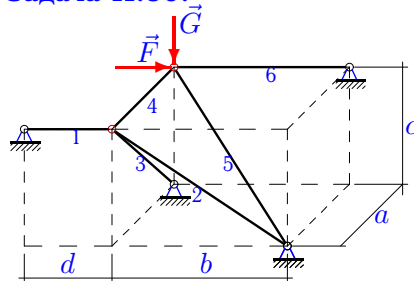


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 3 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 1 \text{ м}.$

Задача 11.30.

8

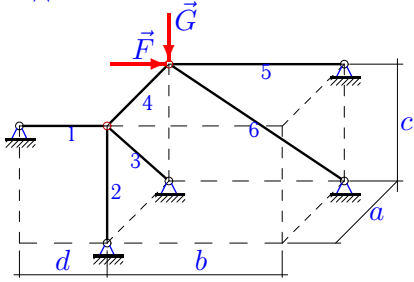


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.31.

8

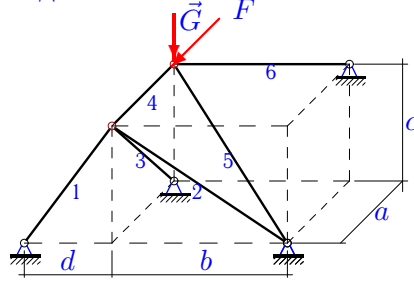


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.32.

8

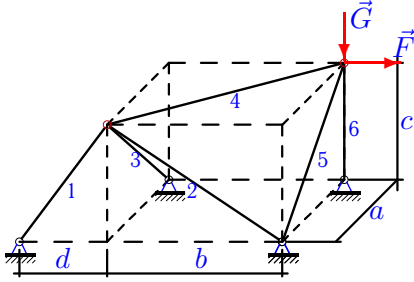


$G = 5 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 3 \text{ м}, b = 4 \text{ м}, c = 3 \text{ м}, d = 2 \text{ м}.$

Задача 11.33.

8

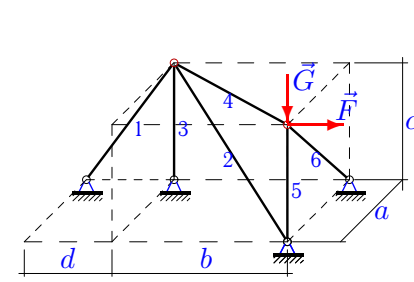


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 4 \text{ м}.$

Задача 11.34.

8



$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

$a = 4 \text{ м}, b = 6 \text{ м}, c = 5 \text{ м}, d = 3 \text{ м}.$

Пространственная ферма

	S_1	S_2	S_3	S_4	S_5	S_6
1	9.375	7.204	-21.633	18.000	-26.325	13.000
2	2.539	-4.301	2.500	1.537	-8.000	-1.167
3	-6.770	9.323	-4.444	-8.000	-0.000	-13.000
4	-0.000	5.000	-7.071	5.000	-9.718	5.667
5	4.000	2.603	-2.867	3.073	-15.484	10.267
6	-0.000	-2.000	2.236	-1.000	3.750	-6.250
7	1.944	-1.434	-0.833	1.537	-12.167	-1.434
8	5.208	4.002	-12.019	10.000	-17.550	10.000
9	-12.649	14.422	-8.000	-4.000	-0.000	-9.000
10	1.000	0.750	-1.458	1.601	-11.662	8.750
11	0.000	-3.510	1.600	3.124	-8.400	-2.884
12	5.000	5.000	-8.944	4.000	-10.770	4.000
13	-0.000	-3.536	1.500	3.202	-9.500	-2.915
14	0.000	-3.510	1.600	3.124	-9.400	-2.884
15	0.000	-0.714	1.229	-1.000	12.000	-15.620
16	3.037	-4.301	0.833	1.537	-11.167	-1.434
17	1.803	-0.750	-1.458	1.601	-1.458	-9.250
18	15.635	8.333	-21.213	5.000	-13.606	9.333
19	-8.098	9.323	-0.000	-8.000	-17.205	14.000
20	-0.000	-0.000	-0.000	-0.000	9.800	-14.058
21	0.000	-3.590	2.667	2.404	-6.333	-2.981
22	1.944	-1.067	-0.833	1.202	-5.000	-0.667
23	3.162	-1.458	-2.250	1.601	-7.000	-1.250
24	2.449	-3.727	1.333	1.202	-3.000	-0.667
25	1.667	-0.533	-1.442	1.562	-1.442	-10.200
26	5.818	4.731	-13.026	10.600	-18.879	10.800
27	0.000	-3.510	1.600	3.124	-10.400	-2.884
28	-9.428	8.537	-0.000	-4.000	-6.403	4.000
29	3.162	-5.303	3.750	1.250	-7.250	-1.061
30	10.800	14.058	-11.526	7.200	-15.795	8.800
31	-0.000	-0.000	-0.000	-0.000	8.600	-12.496
32	2.404	1.667	-4.243	3.000	-9.718	6.667
33	2.561	-0.521	-2.134	2.404	-2.134	-9.333
34	0.000	-2.925	1.667	2.404	-6.333	-2.134