

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. 10

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

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

Задача 11.2. 10

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

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

Задача 11.3. 10

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

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

Задача 11.4. 10

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

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

Задача 11.5. 10

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

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

Задача 11.6. 10

$G = 6 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.7. 10

$G = 10 \text{ кН},$
 $F = 4 \text{ кН}.$

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

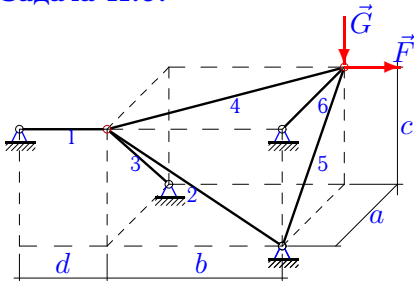
Задача 11.8. 10

$G = 8 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.9.

10

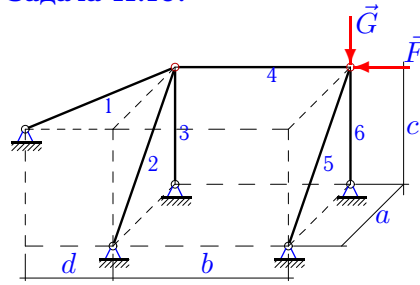


$G = 5 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.10.

10

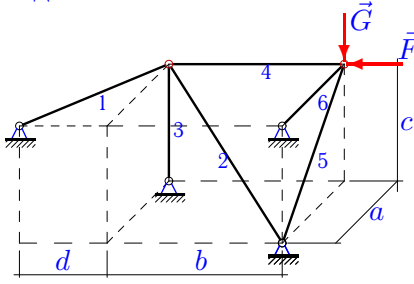


$G = 10 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.11.

10

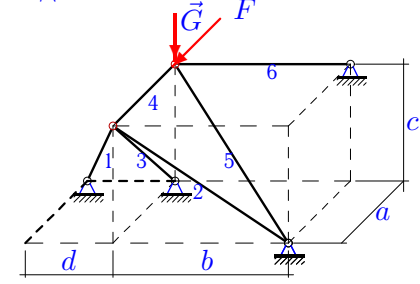


$G = 6 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.12.

10

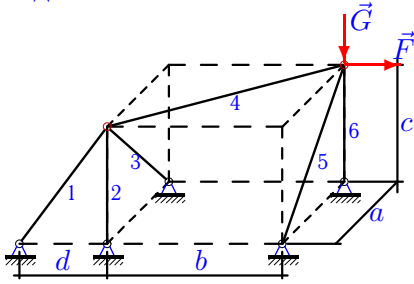


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.13.

10

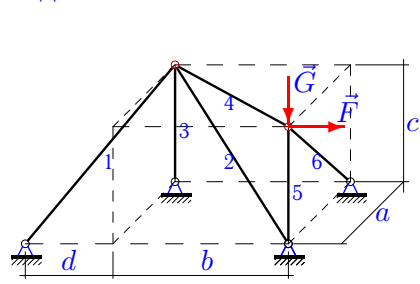


$G = 11 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.14.

10

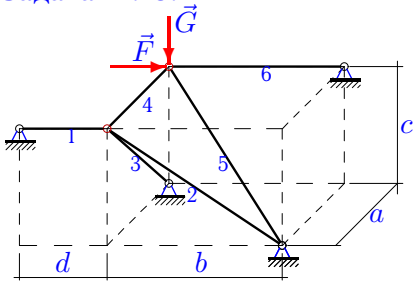


$G = 14 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.15.

10

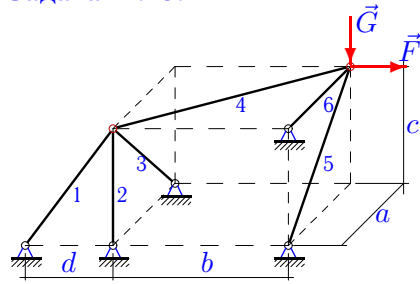


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.16.

10

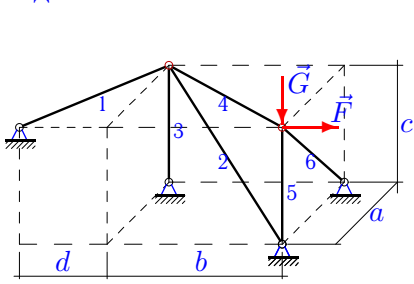


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.17.

10

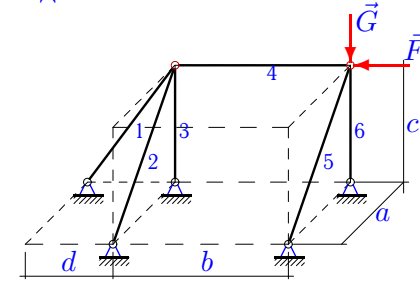


$G = 13 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.18.

10

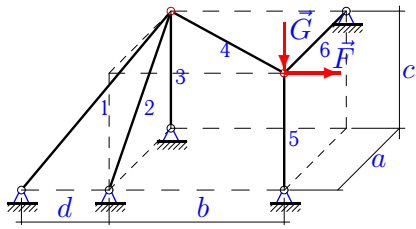


$G = 12 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.19.

10

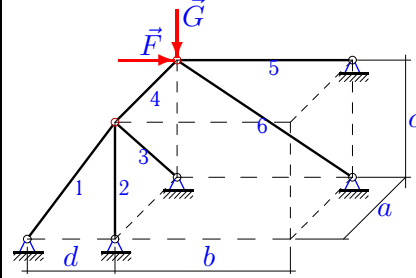


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.20.

10

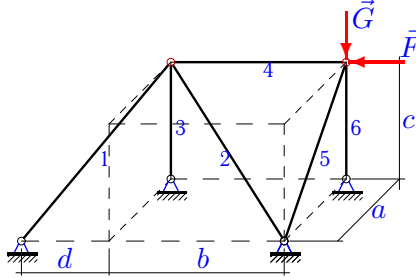


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.21.

10

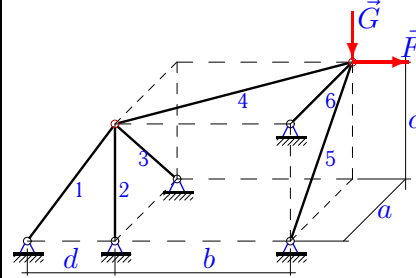


$G = 6 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.22.

10

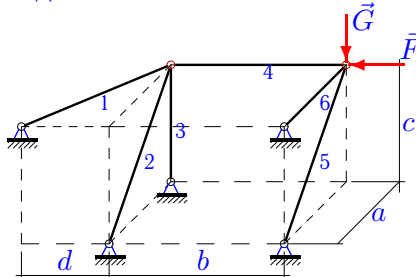


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.23.

10

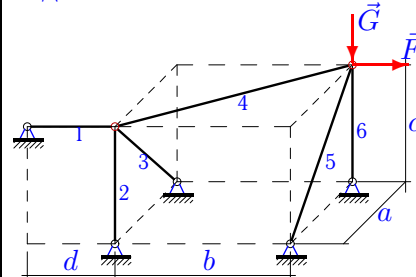


$G = 7 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.24.

10

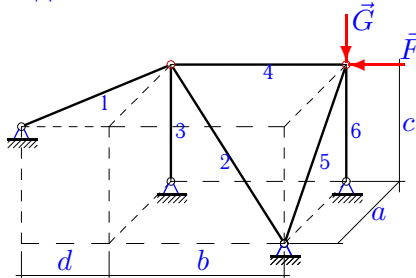


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.25.

10

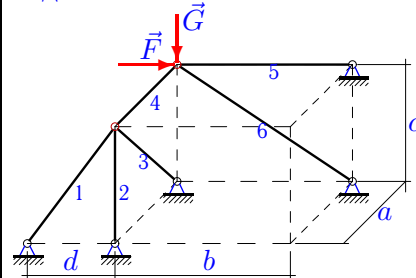


$G = 9 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.26.

10

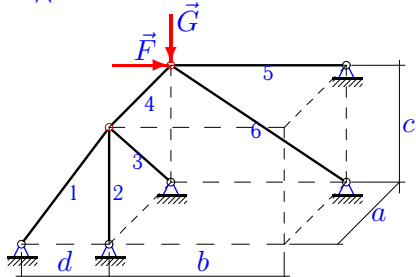


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.27.

10

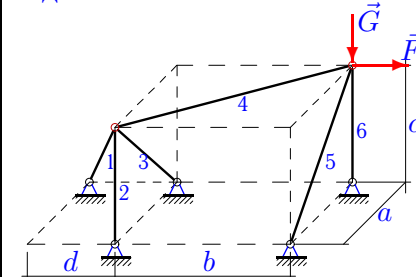


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.28.

10

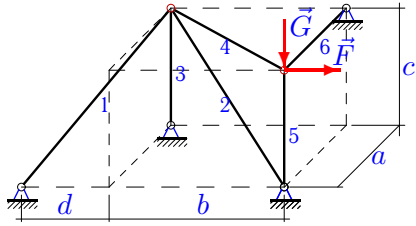


$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.29.

10

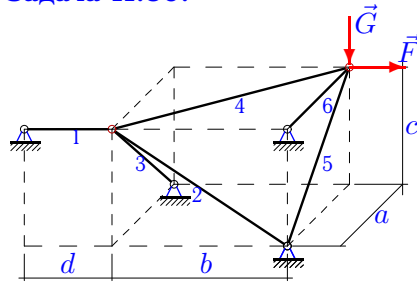


$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.30.

10

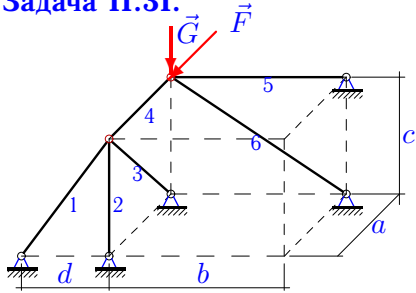


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.31.

10

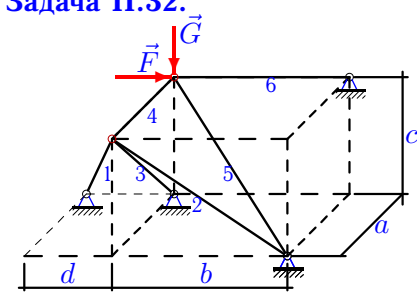


$G = 5 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.32.

10

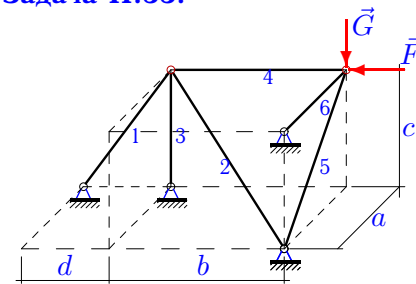


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.33.

10

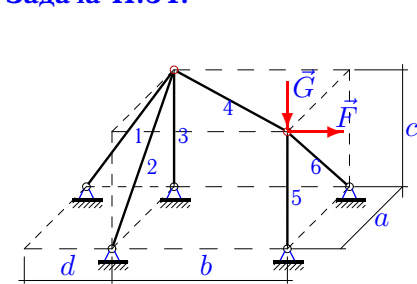


$G = 8 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.34.

10



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

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

Пространственная ферма

	S_1	S_2	S_3	S_4	S_5	S_6
1	2.449	-3.727	1.333	1.202	-6.667	-1.491
2	3.037	-4.301	0.833	1.537	-9.167	-1.434
3	-17.889	-0.000	16.000	-8.000	-0.000	-10.000
4	9.381	2.500	-10.607	2.500	-7.071	3.500
5	2.345	0.750	-3.182	1.250	-1.061	-6.250
6	-7.838	8.616	-0.000	-8.000	-0.000	-6.000
7	-20.396	23.324	-12.000	-4.000	-0.000	-10.000
8	-7.775	-0.000	6.667	-4.000	-0.000	-8.000
9	4.000	2.500	-2.121	2.500	-7.071	3.500
10	-6.667	8.537	-6.667	-4.000	-0.000	-10.000
11	-5.060	9.330	-4.800	-8.000	-8.485	6.000
12	27.241	14.951	-41.168	13.400	-23.074	13.200
13	1.601	-0.417	-1.434	1.537	-1.434	-10.167
14	-0.000	-3.496	1.667	3.073	-12.333	-2.867
15	14.667	18.333	-21.380	18.333	-25.927	12.667
16	1.803	-0.750	-1.458	1.601	-13.606	10.417
17	-0.000	-3.496	1.667	3.073	-11.333	-2.867
18	-8.944	-0.000	8.000	-4.000	-0.000	-12.000
19	3.742	-5.048	0.800	1.562	-8.000	-1.200
20	-0.000	-0.000	-0.000	-0.000	8.600	-12.496
21	-7.838	8.616	-0.000	-8.000	-0.000	-6.000
22	1.803	-0.750	-1.458	1.601	-13.606	10.417
23	-20.396	23.324	-12.000	-4.000	-13.606	11.667
24	1.000	0.833	-1.067	1.202	-1.067	-9.167
25	-4.444	7.800	-4.444	-8.000	-0.000	-9.000
26	-0.000	-0.000	-0.000	-0.000	11.500	-16.008
27	-0.000	-0.000	-0.000	-0.000	8.333	-11.667
28	3.082	0.750	-4.373	1.601	-1.458	-8.250
29	-0.000	-3.510	1.600	3.124	-8.000	-2.400
30	4.000	2.603	-2.134	2.404	-8.964	4.267
31	-0.000	-2.000	2.236	-1.000	3.750	-6.250
32	24.914	17.183	-35.217	8.800	-19.305	11.200
33	-25.298	-0.000	24.000	-8.000	-15.549	13.333
34	2.236	-1.491	-0.667	1.202	-4.667	-1.491