

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. 6

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

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

Задача 11.2. 6

$G = 4 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.3. 6

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

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

Задача 11.4. 6

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

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

Задача 11.5. 6

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

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

Задача 11.6. 6

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

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

Задача 11.7. 6

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

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

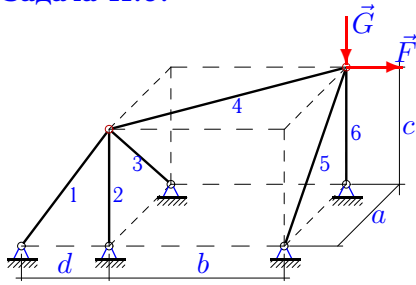
Задача 11.8. 6

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

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

Задача 11.9.

6

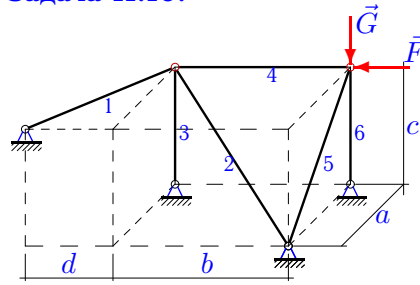


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.10.

6

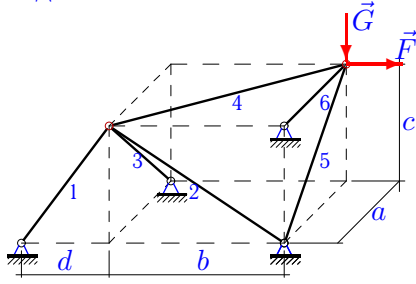


$G = 13 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.11.

6

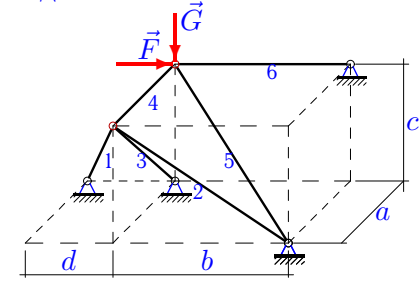


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.12.

6

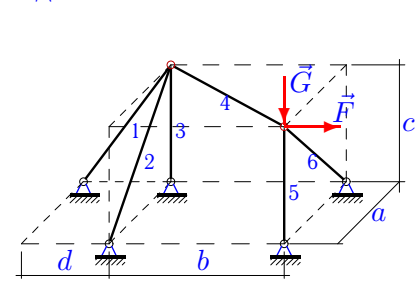


$G = 12 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.13.

6

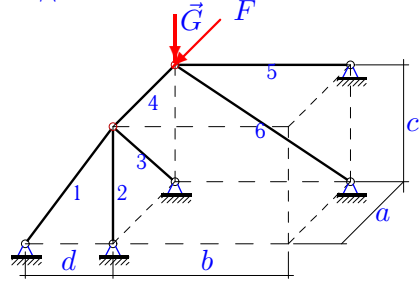


$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.14.

6

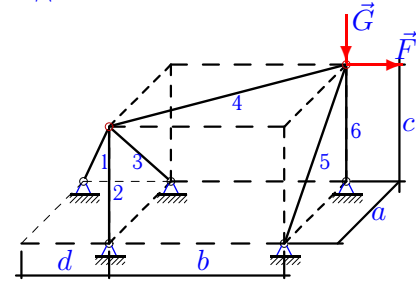


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.15.

6

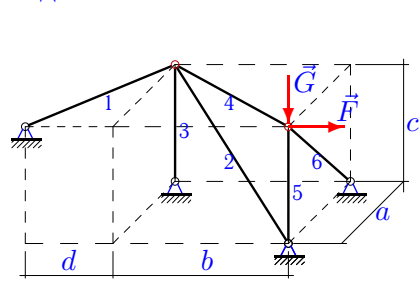


$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.16.

6

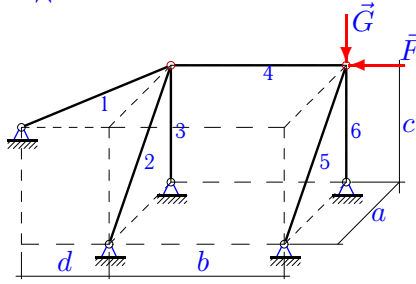


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.17.

6

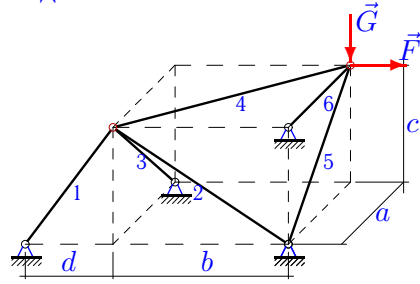


$G = 13 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.18.

6

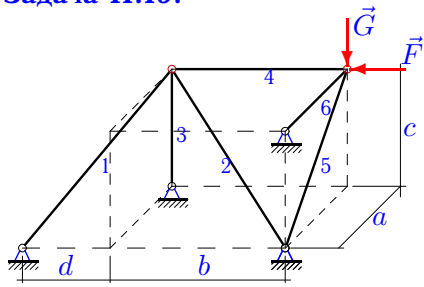


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.19.

6

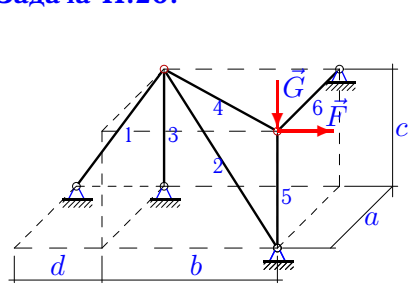


$G = 5 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.20.

6

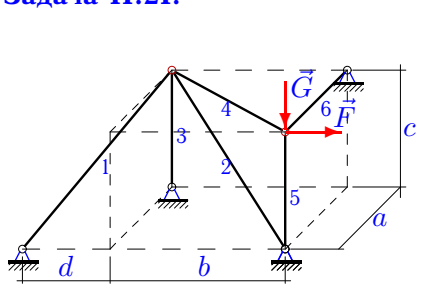


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.21.

6

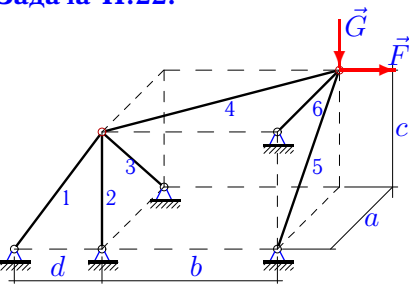


$G = 5 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.22.

6

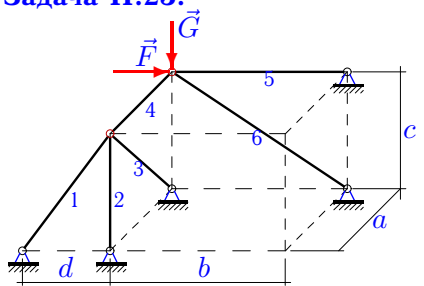


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.23.

6

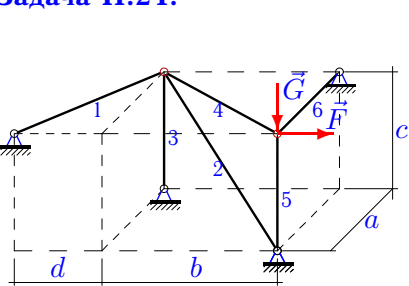


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.24.

6

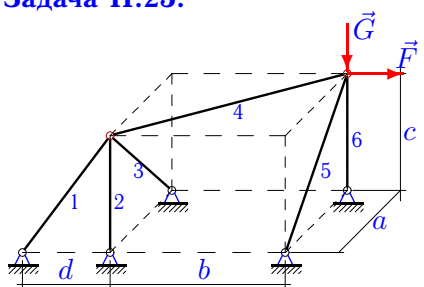


$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.25.

6

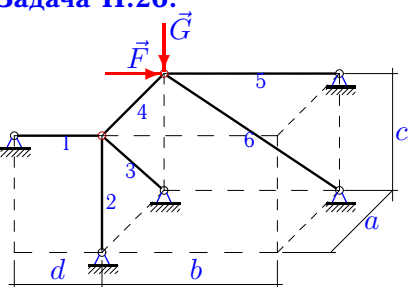


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.26.

6

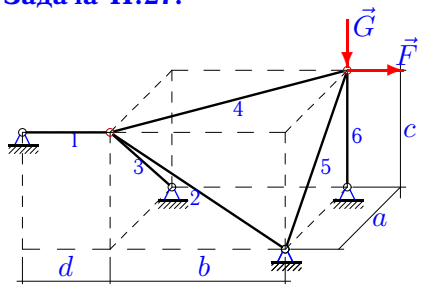


$G = 9 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.27.

6

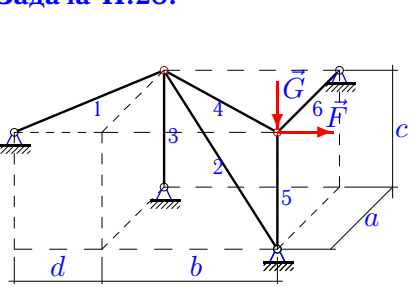


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.28.

6

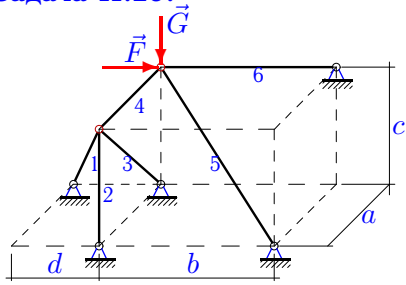


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.29.

6

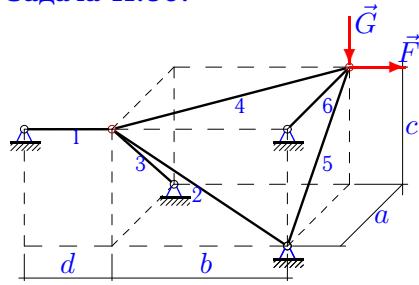


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.30.

6

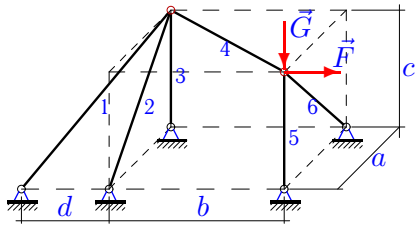


$G = 4 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.31.

6

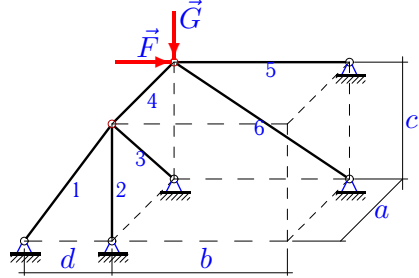


$G = 12 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.32.

6

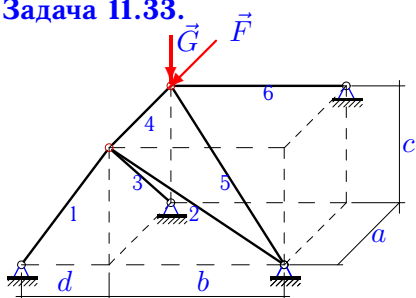


$G = 11 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.33.

6

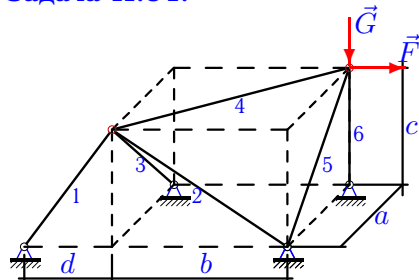


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.34.

6



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

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

Пространственная ферма

	S_1	S_2	S_3	S_4	S_5	S_6
1	-0.000	-3.536	1.500	3.202	-10.500	-2.915
2	0.000	3.000	-4.243	3.000	-7.775	5.333
3	3.037	-4.301	0.833	1.537	-9.167	-1.434
4	-0.000	-3.496	1.667	3.073	-9.000	-2.333
5	4.000	2.500	-2.915	3.202	-2.915	-8.500
6	1.414	-3.727	3.333	1.202	-6.667	-1.491
7	-14.967	14.422	-0.000	-4.000	-0.000	-12.000
8	-4.444	7.800	-4.444	-8.000	-0.000	-8.000
9	1.601	-0.417	-1.067	1.202	-1.067	-6.167
10	-6.770	9.323	-4.444	-8.000	-0.000	-13.000
11	2.500	-0.640	-2.884	3.124	-16.225	11.100
12	49.315	20.000	-69.971	20.000	-28.284	14.000
13	3.162	-1.061	-2.250	1.250	-8.250	-1.061
14	0.000	-1.250	1.601	-1.000	8.400	-10.934
15	1.887	0.833	-2.668	1.202	-1.067	-8.167
16	0.000	-3.510	1.600	3.124	-9.400	-2.884
17	-10.154	11.470	-6.667	-4.000	-0.000	-13.000
18	2.561	-0.521	-2.867	3.073	-15.484	10.267
19	-7.838	8.616	-0.000	-8.000	-5.590	2.500
20	-0.000	-3.496	1.667	3.073	-9.000	-2.333
21	0.000	-2.915	1.500	2.500	-5.000	-1.500
22	1.601	-0.417	-1.434	1.537	-13.764	10.033
23	-0.000	-0.000	-0.000	-0.000	8.600	-12.496
24	0.000	-3.510	1.600	3.124	-8.000	-2.400
25	1.803	-0.750	-1.061	1.250	-1.061	-6.250
26	-0.000	-0.000	-0.000	-0.000	11.000	-15.000
27	4.000	2.603	-2.867	3.073	-2.867	-9.333
28	-0.000	-2.925	1.667	2.404	-7.000	-1.333
29	-0.000	7.000	-13.606	11.667	-16.499	8.333
30	4.000	3.333	-2.981	2.404	-4.472	0.667
31	3.742	-5.048	0.800	1.562	-11.200	-1.442
32	-0.000	-0.000	-0.000	-0.000	12.750	-17.609
33	4.006	2.778	-7.071	5.000	-13.606	9.333
34	2.404	-0.833	-2.915	3.202	-2.915	-9.500