

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. 3

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

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

Задача 11.2. 3

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

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

Задача 11.3. 3

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

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

Задача 11.4. 3

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

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

Задача 11.5. 3

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

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

Задача 11.6. 3

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

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

Задача 11.7. 3

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

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

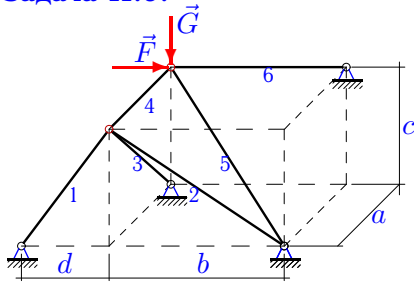
Задача 11.8. 3

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

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

Задача 11.9.

3

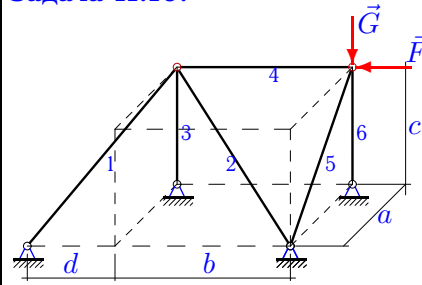


$G = 10 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.10.

3

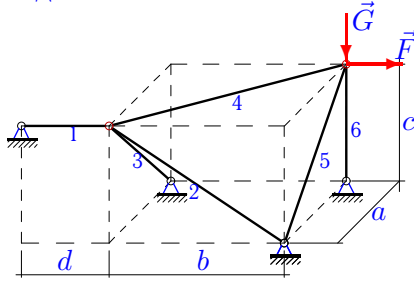


$G = 12 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.11.

3

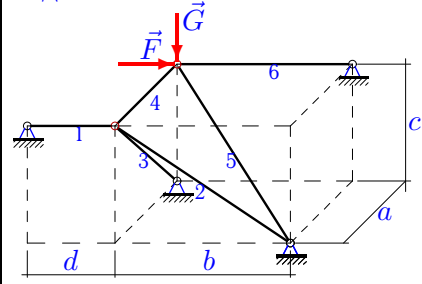


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.12.

3

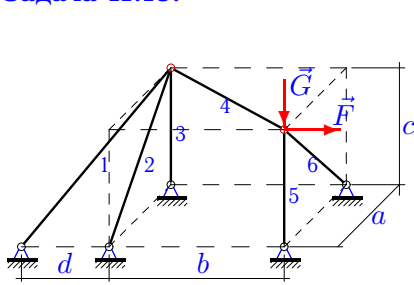


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.13.

3

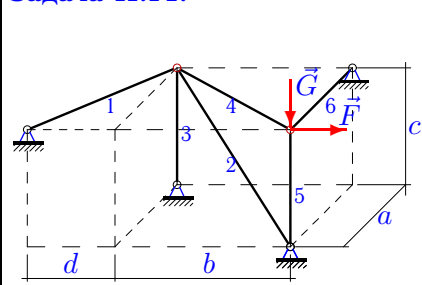


$G = 11 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.14.

3

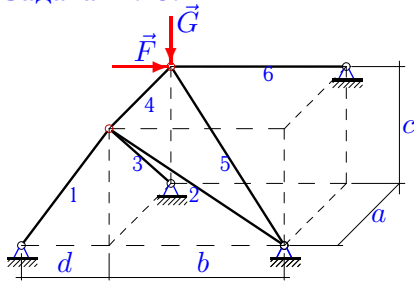


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.15.

3

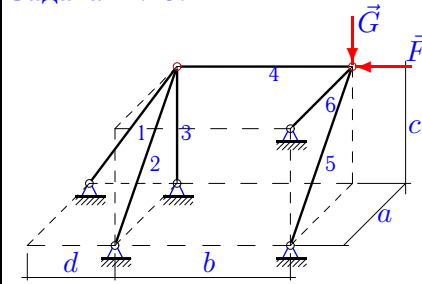


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.16.

3

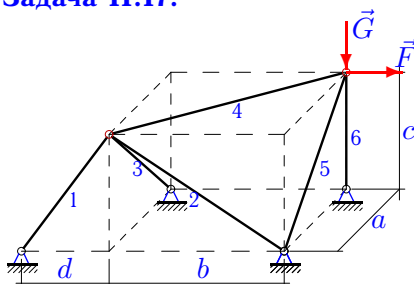


$G = 9 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.17.

3

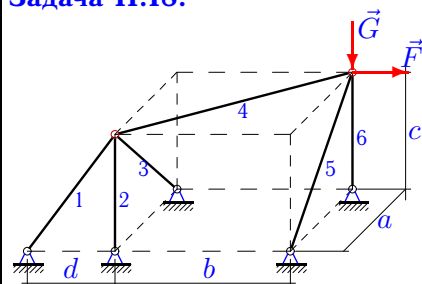


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.18.

3

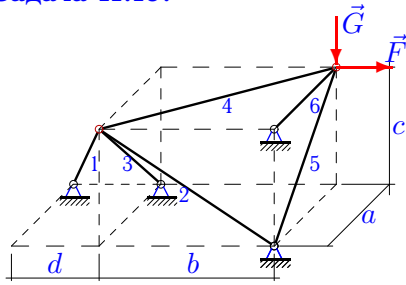


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.19.

3

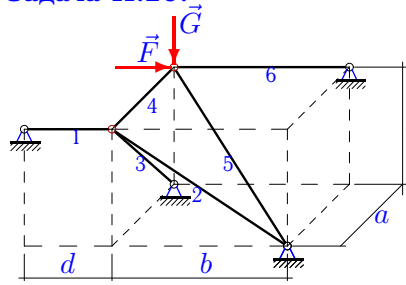


$G = 4 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.20.

3

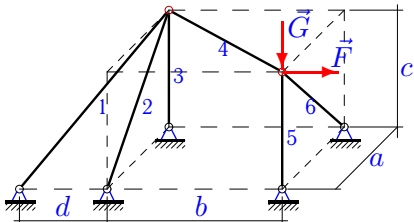


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.21.

3

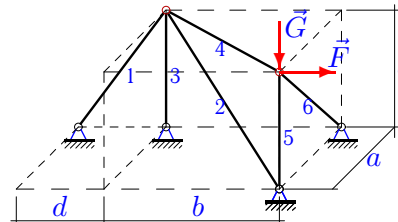


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.22.

3

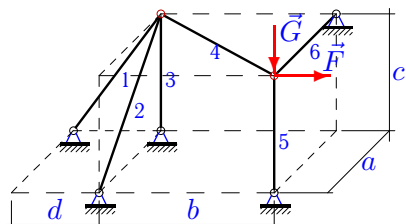


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.23.

3

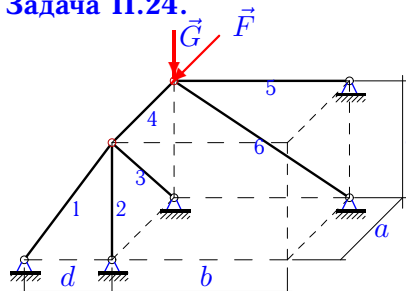


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.24.

3

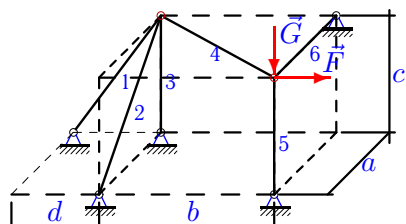


$G = 5 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.25.

3

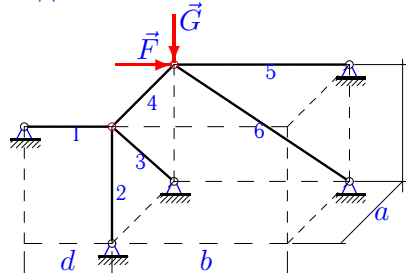


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.26.

3

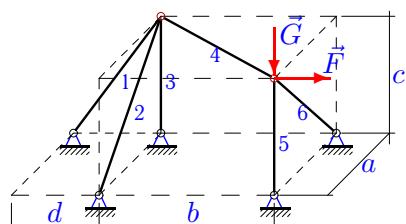


$G = 11 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.27.

3

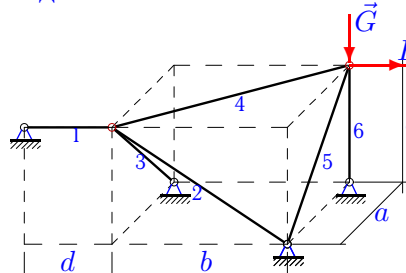


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.28.

3

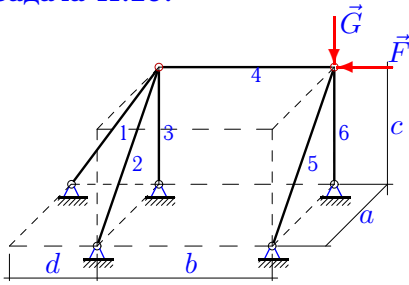


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.29.

3

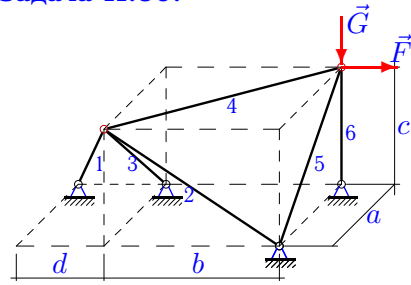


$G = 8 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.30.

3

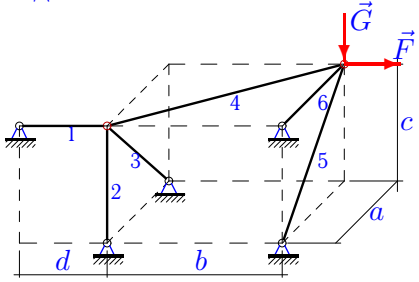


$G = 9 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.31.

3

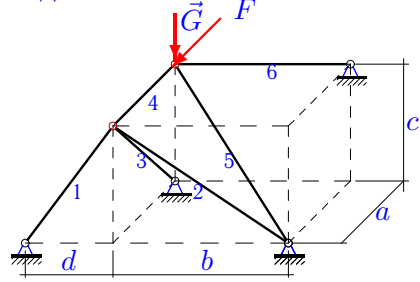


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.32.

3

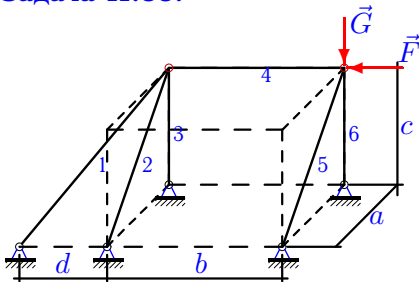


$G = 5 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.33.

3

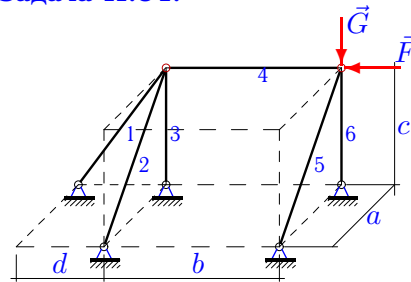


$G = 11 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.34.

3



$G = 11 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Пространственная ферма

	S_1	S_2	S_3	S_4	S_5	S_6
1	9.220	7.498	-20.646	16.800	-25.171	12.400
2	2.404	-0.833	-2.121	2.500	-2.121	-5.500
3	4.000	2.561	-2.884	3.124	-2.884	-10.400
4	1.887	0.833	-2.668	1.202	-1.067	-7.167
5	1.944	-1.067	-0.833	1.202	-9.167	-1.067
6	-0.000	-0.000	-0.000	-0.000	12.200	-17.183
7	1.887	0.833	-2.668	1.202	-6.403	3.333
8	-0.000	-3.496	1.667	3.073	-10.333	-2.867
9	7.684	6.248	-12.806	8.000	-17.550	10.000
10	-9.466	11.314	0.000	-8.000	-0.000	-12.000
11	4.000	2.500	-2.121	2.500	-2.121	-7.500
12	11.250	14.407	-16.225	13.500	-19.744	9.250
13	5.916	-7.289	0.750	1.601	-10.250	-1.458
14	-0.000	-2.925	1.667	2.404	-7.000	-1.333
15	8.452	6.873	-14.087	8.800	-19.305	11.200
16	-7.775	-0.000	6.667	-4.000	-15.484	12.600
17	2.561	-0.521	-2.134	2.404	-2.134	-7.333
18	1.803	-0.750	-1.458	1.601	-1.458	-7.250
19	7.180	3.333	-8.944	2.404	-4.472	0.667
20	10.800	14.058	-11.526	7.200	-15.795	8.800
21	4.359	-5.303	0.750	1.250	-7.250	-1.061
22	0.000	-2.915	1.500	2.500	-5.500	-2.121
23	3.162	-1.458	-2.250	1.601	-7.000	-1.250
24	-0.000	-2.000	2.236	-1.000	3.750	-6.250
25	2.236	-1.442	-1.200	1.562	-8.000	-1.200
26	-0.000	-0.000	-0.000	-0.000	12.750	-17.609
27	3.162	-1.061	-2.250	1.250	-6.250	-1.061
28	4.000	2.500	-2.915	3.202	-2.915	-9.500
29	-12.649	-0.000	12.000	-4.000	-0.000	-8.000
30	12.329	2.500	-14.577	3.202	-2.915	-7.500
31	1.000	0.833	-1.434	1.537	-13.764	10.033
32	2.404	1.667	-4.243	3.000	-9.718	6.667
33	-23.664	23.324	0.000	-4.000	-0.000	-11.000
34	-12.649	-0.000	12.000	-4.000	-0.000	-11.000