

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. 9

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

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

Задача 11.2. 9

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

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

Задача 11.3. 9

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

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

Задача 11.4. 9

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

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

Задача 11.5. 9

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

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

Задача 11.6. 9

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

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

Задача 11.7. 9

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

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

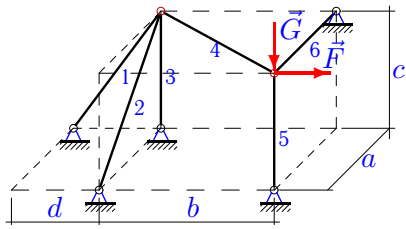
Задача 11.8. 9

$G = 7 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.9.

9

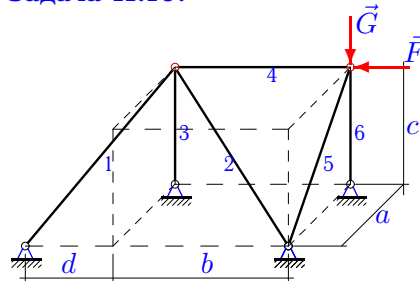


$G = 6 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.10.

9

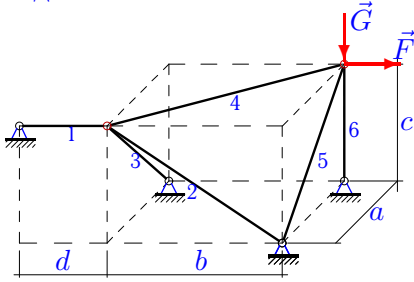


$G = 13 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.11.

9

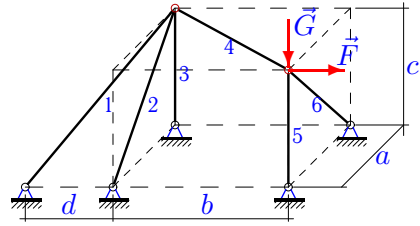


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.12.

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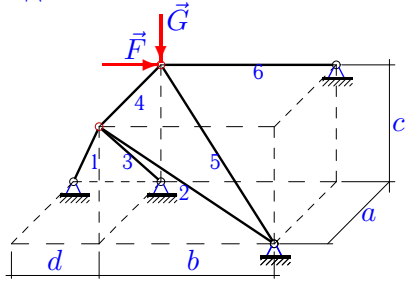


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.13.

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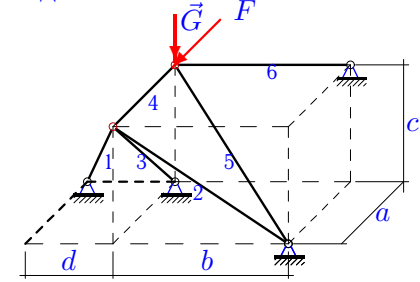


$G = 6 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.14.

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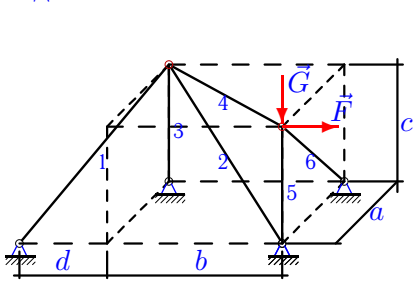


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.15.

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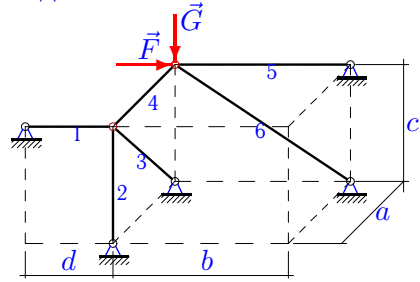


$G = 7 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.16.

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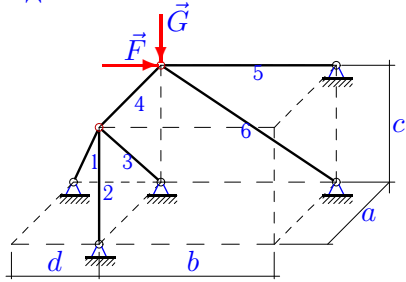


$G = 10 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.17.

9

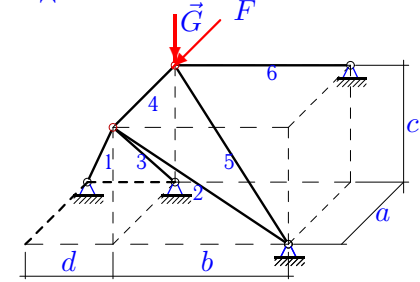


$G = 7 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.18.

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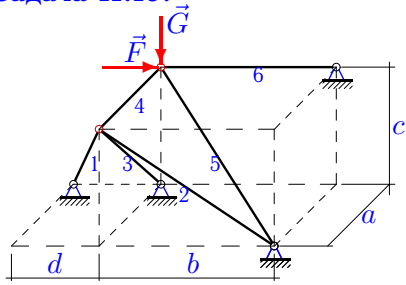


$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.19.

9

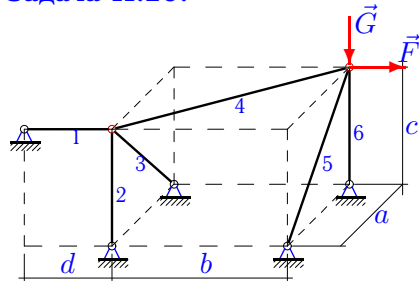


$G = 11 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.20.

9

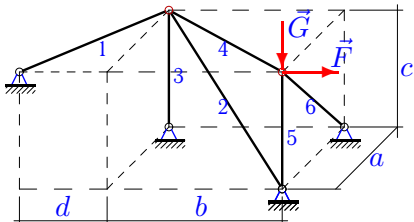


$G = 11 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.21.

9

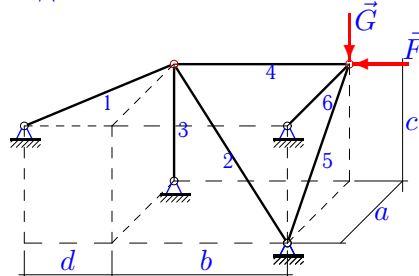


$G = 12 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.22.

9

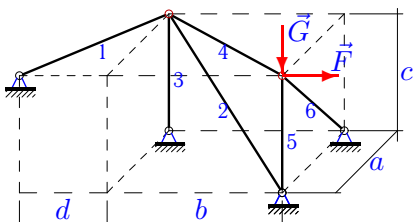


$G = 7 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.23.

9

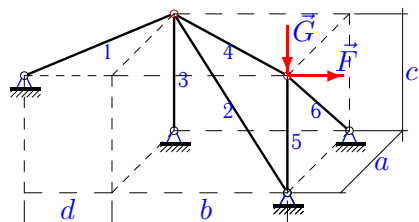


$G = 14 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.24.

9

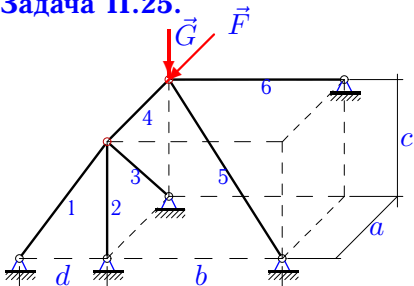


$G = 12 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.25.

9

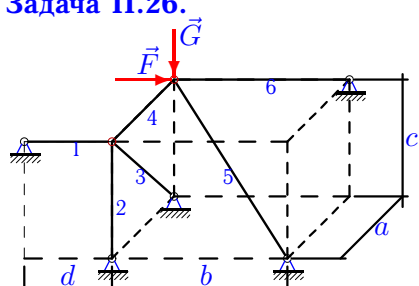


$G = 4 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.26.

9

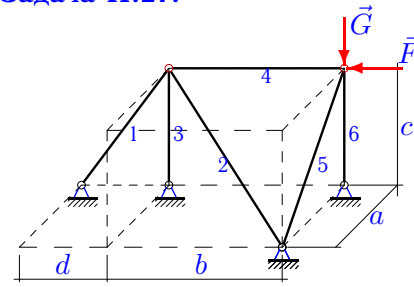


$G = 8 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.27.

9

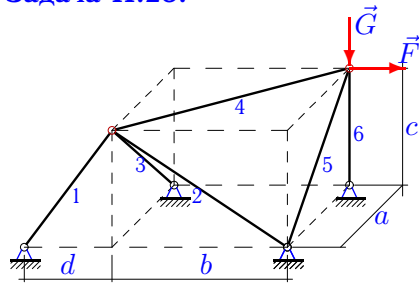


$G = 11 \text{ кН},$
 $F = 8 \text{ кН}.$

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

Задача 11.28.

9

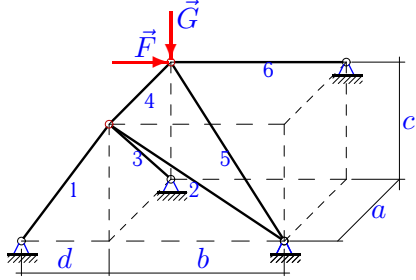


$G = 10 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.29.

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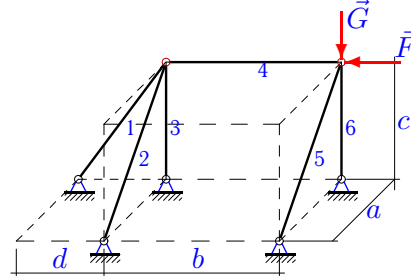


$G = 13 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.30.

9

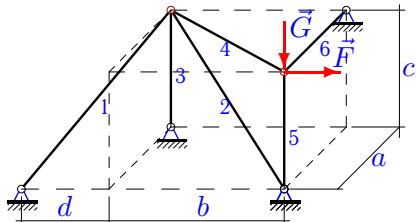


$G = 7 \text{ кН},$
 $F = 4 \text{ кН}.$

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

Задача 11.31.

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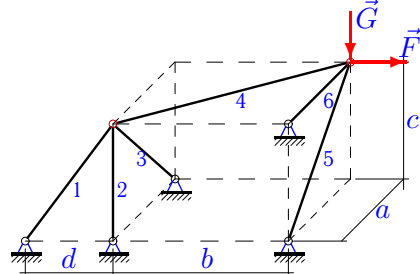


$G = 8 \text{ кН},$
 $F = 2 \text{ кН}.$

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

Задача 11.32.

9

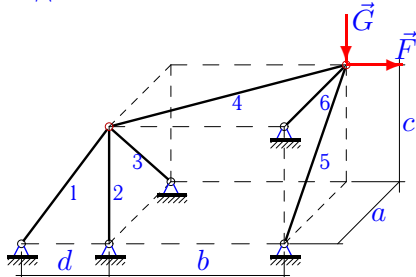


$G = 6 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.33.

9

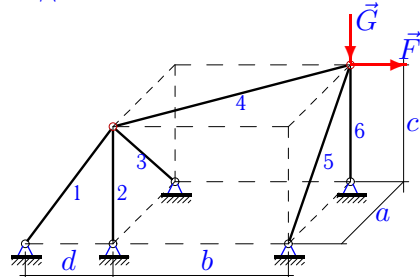


$G = 4 \text{ кН},$
 $F = 1 \text{ кН}.$

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

Задача 11.34.

9



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

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

Пространственная ферма

	S_1	S_2	S_3	S_4	S_5	S_6
1	-0.000	-0.000	-0.000	-0.000	12.750	-17.609
2	-7.838	8.616	-0.000	-8.000	-0.000	-6.000
3	-4.525	8.616	-6.400	-8.000	-0.000	-9.000
4	-8.944	-0.000	8.000	-4.000	-0.000	-8.000
5	-4.444	7.800	-4.444	-8.000	-0.000	-10.000
6	-5.060	9.330	-4.800	-8.000	-0.000	-10.000
7	5.099	-7.289	3.750	1.601	-9.250	-1.458
8	-6.974	9.330	-0.000	-8.000	-0.000	-7.000
9	3.162	-1.458	-2.250	1.601	-6.000	-1.250
10	-8.552	10.029	0.000	-8.000	-0.000	-13.000
11	4.000	2.603	-2.867	3.073	-2.867	-9.333
12	3.037	-4.301	0.833	1.537	-9.167	-1.434
13	18.762	10.000	-25.456	6.000	-11.662	6.000
14	27.241	14.951	-41.168	13.400	-23.074	13.200
15	0.000	-2.915	1.500	2.500	-5.500	-2.121
16	-0.000	-0.000	-0.000	-0.000	11.500	-16.008
17	-0.000	-0.000	-0.000	-0.000	4.250	-8.750
18	12.457	8.591	-17.609	4.400	-14.040	9.600
19	24.914	17.183	-35.217	8.800	-19.305	11.200
20	1.000	0.800	-1.442	1.562	-1.442	-10.200
21	-0.000	-3.496	1.667	3.073	-10.333	-2.867
22	-4.444	7.800	-4.444	-8.000	-8.964	5.600
23	-0.000	-3.496	1.667	3.073	-12.333	-2.867
24	-0.000	-3.496	1.667	3.073	-10.333	-2.867
25	0.000	3.000	-4.243	3.000	-7.775	5.333
26	-0.000	8.000	-14.422	12.000	-17.550	9.000
27	-25.298	-0.000	24.000	-8.000	-0.000	-11.000
28	2.404	-0.833	-2.121	2.500	-2.121	-8.500
29	9.989	8.123	-22.366	18.200	-27.269	13.600
30	-12.649	-0.000	12.000	-4.000	-0.000	-7.000
31	-0.000	-3.510	1.600	3.124	-8.000	-2.400
32	1.601	-0.417	-1.067	1.202	-7.684	4.133
33	1.667	-0.000	-1.491	1.202	-4.472	1.333
34	1.803	-0.750	-1.458	1.601	-1.458	-9.250