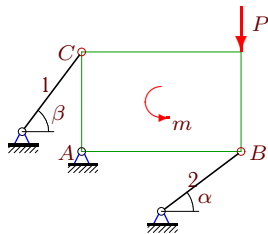


## Статически неопределимая стержневая система (1)

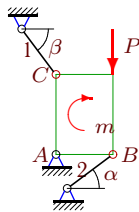
Шарнирно закрепленная пластина удерживается в равновесии двумя стержнями одинаковой жесткости. Длины стержней  $l_1$  и  $l_2$ . На пластину действует момент  $m$  и вертикальная сила  $P$ . Найти усилия в стержнях.

### Задача 23.1.



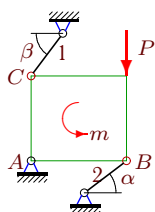
$P = 200$  Н,  $m = 265$  Нм,  $AB = 8$  м,  
 $AC = 5$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

### Задача 23.2.



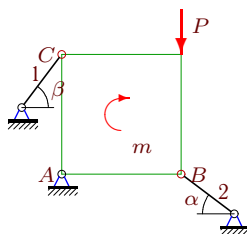
$P = 160$  Н,  $m = 85$  Нм,  $AB = 5$  м,  
 $AC = 7$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

### Задача 23.3.



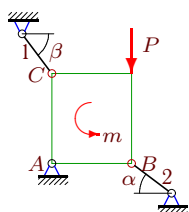
$P = 340$  Н,  $m = 885$  Нм,  $AB = 9$  м,  
 $AC = 8$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

### Задача 23.4.



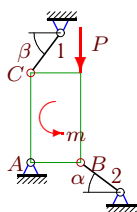
$P = 140$  Н,  $m = 441$  Нм,  $AB = 9$  м,  
 $AC = 9$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

### Задача 23.5.



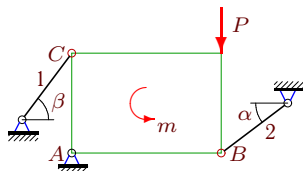
$P = 330$  Н,  $m = 465$  Нм,  $AB = 8$  м,  
 $AC = 9$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

### Задача 23.6.



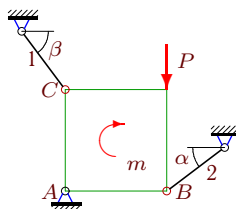
$P = 290$  Н,  $m = 85$  Нм,  $AB = 5$  м,  
 $AC = 9$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

### Задача 23.7.



$P = 320$  Н,  $m = 1368$  Нм,  $AB = 9$  м,  
 $AC = 6$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (4/5)l_1$ .

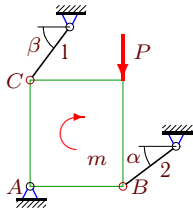
### Задача 23.8.



$P = 210$  Н,  $m = 147$  Нм,  $AB = 7$  м,  
 $AC = 7$  м,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.9.**

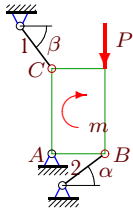
1



$P = 120 \text{ Н}$ ,  $m = 414 \text{ Нм}$ ,  $AB = 7 \text{ м}$ ,  
 $AC = 8 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

**Задача 23.11.**

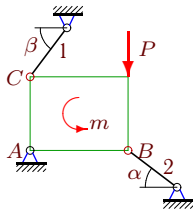
1



$P = 200 \text{ Н}$ ,  $m = 335 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 8 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

**Задача 23.13.**

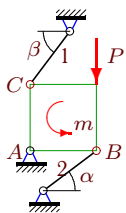
1



$P = 170 \text{ Н}$ ,  $m = 436 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 6 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

**Задача 23.15.**

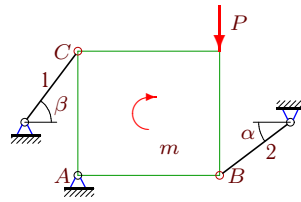
1



$P = 290 \text{ Н}$ ,  $m = 925 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 5 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

**Задача 23.10.**

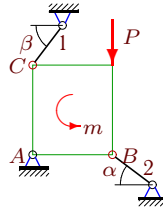
1



$P = 180 \text{ Н}$ ,  $m = 447 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 7 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.12.**

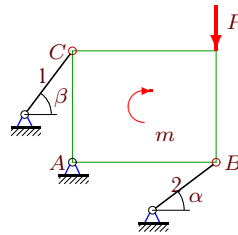
1



$P = 230 \text{ Н}$ ,  $m = 49 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (3/5)l_1$ .

**Задача 23.14.**

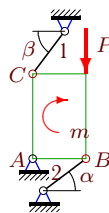
1



$P = 40 \text{ Н}$ ,  $m = 1833 \text{ Нм}$ ,  $AB = 9 \text{ м}$ ,  
 $AC = 7 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.16.**

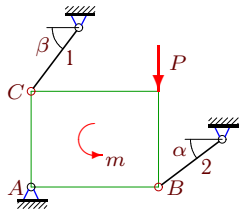
1



$P = 200 \text{ Н}$ ,  $m = 410 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 8 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.17.**

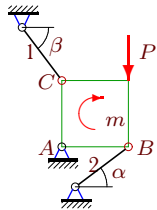
1



$P = 210 \text{ Н}$ ,  $m = 180 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 6 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

**Задача 23.19.**

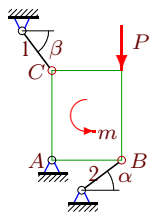
1



$P = 90 \text{ Н}$ ,  $m = 375 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 5 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.21.**

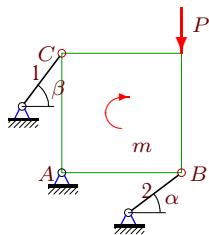
1



$P = 290 \text{ Н}$ ,  $m = 521 \text{ Нм}$ ,  $AB = 7 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

**Задача 23.23.**

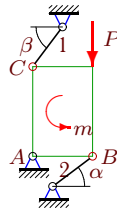
1



$P = 190 \text{ Н}$ ,  $m = 963 \text{ Нм}$ ,  $AB = 9 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.18.**

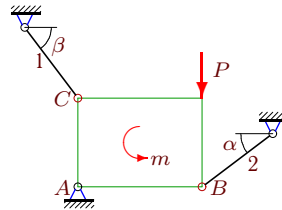
1



$P = 290 \text{ Н}$ ,  $m = 93 \text{ Нм}$ ,  $AB = 6 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (4/5)l_1$ .

**Задача 23.20.**

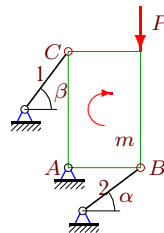
1



$P = 160 \text{ Н}$ ,  $m = 451 \text{ Нм}$ ,  $AB = 7 \text{ м}$ ,  
 $AC = 5 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (2/5)l_1$ .

**Задача 23.22.**

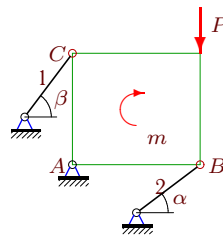
1



$P = 210 \text{ Н}$ ,  $m = 285 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 8 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

**Задача 23.24.**

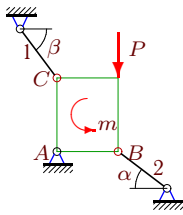
1



$P = 60 \text{ Н}$ ,  $m = 1023 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 7 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (4/5)l_1$ .

**Задача 23.25.**

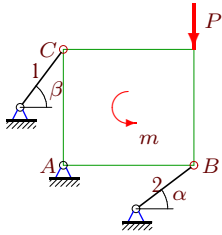
1



$P = 290 \text{ Н}$ ,  $m = 685 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 6 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (3/5)l_1$ .

**Задача 23.27.**

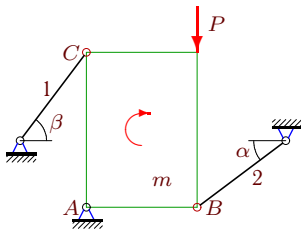
1



$P = 280 \text{ Н}$ ,  $m = 588 \text{ Нм}$ ,  $AB = 9 \text{ м}$ ,  
 $AC = 8 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (4/5)l_1$ .

**Задача 23.29.**

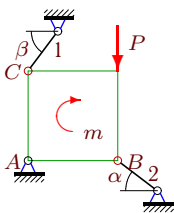
1



$P = 130 \text{ Н}$ ,  $m = 310 \text{ Нм}$ ,  $AB = 5 \text{ м}$ ,  
 $AC = 7 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (3/5)l_1$ .

**Задача 23.31.**

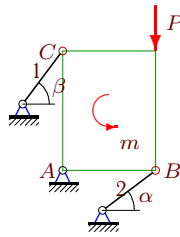
1



$P = 110 \text{ Н}$ ,  $m = 1197 \text{ Нм}$ ,  $AB = 9 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (4/5)l_1$ .

**Задача 23.26.**

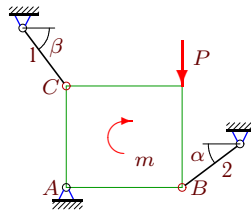
1



$P = 320 \text{ Н}$ ,  $m = 143 \text{ Нм}$ ,  $AB = 7 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (6/5)l_1$ .

**Задача 23.28.**

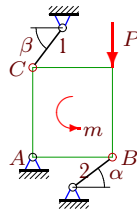
1



$P = 80 \text{ Н}$ ,  $m = 1055 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 7 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_1 = l_2$ .

**Задача 23.30.**

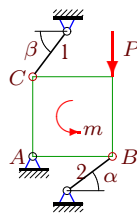
1



$P = 360 \text{ Н}$ ,  $m = 1089 \text{ Нм}$ ,  $AB = 8 \text{ м}$ ,  
 $AC = 9 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (3/5)l_1$ .

**Задача 23.32.**

1



$P = 300 \text{ Н}$ ,  $m = 924 \text{ Нм}$ ,  $AB = 7 \text{ м}$ ,  
 $AC = 7 \text{ м}$ ,  $\cos \alpha = \sin \beta = 0.8$ ,  $l_2 = (3/5)l_1$ .

**Статически неопределимая стержневая система (1)**

№	$S_1$	$S_2$
1	-200	125
2	-50	175
3	-225	-200
4	90	225
5	200	225
6	50	-225
7	180	150
8	210	175
9	70	-200
10	240	175
11	-125	200
12	120	-225
13	80	-150
14	-270	175
15	-50	-125
16	-150	-200
17	200	-150
18	-120	-225
19	-150	125
20	70	125
21	-70	225
22	-125	200
23	-270	225
24	-160	175
25	75	150
26	-210	225
27	-180	200
28	200	175
29	75	175
30	-120	-225
31	180	-225
32	-105	-175