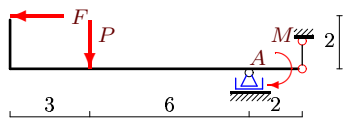


## Равновесие рамы с трением

Одна из опор рамы — негладкая неудерживающая шарнирная опора в точке  $A$  (односторонняя связь). Заданы нагрузки  $P$  и  $M$  и коэффициент трения скольжения в опоре  $A$ . Размеры на рисунке даны в метрах. Для каких значений силы  $F$  система находится в положении равновесия?

**Задача S-10.1.**

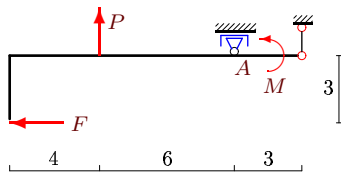
14



$$P = 7 \text{ кН}, M = 44 \text{ кНм}, f_{\text{тр}} = 1/2.$$

**Задача S-10.2.**

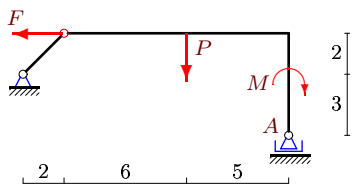
14



$$P = 8 \text{ кН}, M = 45 \text{ кНм}, f_{\text{тр}} = 1/2.$$

**Задача S-10.3.**

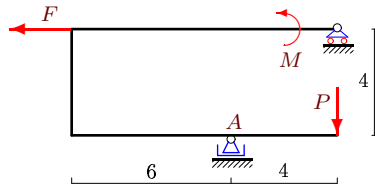
14



$$P = 459 \text{ кН}, M = 918 \text{ кНм}, f_{\text{тр}} = 1/2.$$

**Задача S-10.4.**

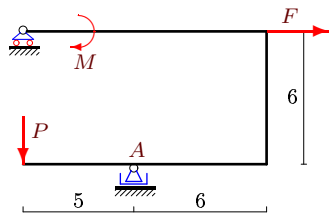
14



$$P = 1 \text{ кН}, M = 200 \text{ кНм}, f_{\text{тр}} = 2/3.$$

**Задача S-10.5.**

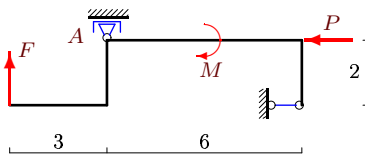
14



$$P = 13 \text{ кН}, M = 152 \text{ кНм}, f_{\text{тр}} = 3/4.$$

**Задача S-10.6.**

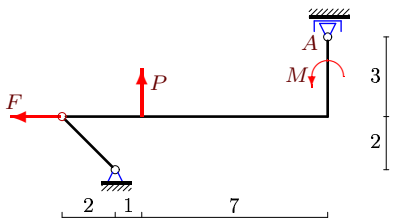
14



$$P = 18 \text{ кН}, M = 27 \text{ кНм}, f_{\text{тр}} = 3/4.$$

**Задача S-10.7.**

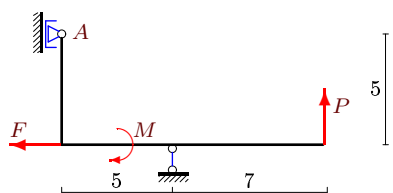
14



$$P = 18 \text{ кН}, M = 18 \text{ кНм}, f_{\text{тр}} = 2/3.$$

**Задача S-10.8.**

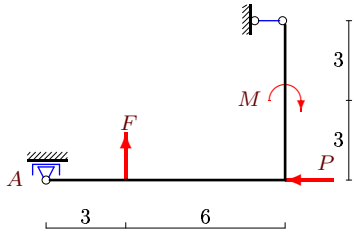
14



$$P = 61 \text{ кН}, M = 52 \text{ кНм}, f_{\text{тр}} = 1/4.$$

Задача S-10.9.

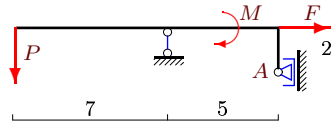
14



$P = 1 \text{ кН}, M = 54 \text{ кНМ}, f_{\text{ТР}} = 3/4.$

Задача S-10.10.

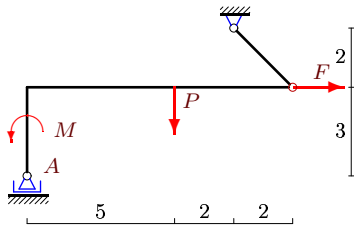
14



$P = 10 \text{ кН}, M = 31 \text{ кНМ}, f_{\text{ТР}} = 1/4.$

Задача S-10.11.

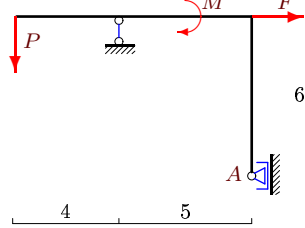
14



$P = 231 \text{ кН}, M = 231 \text{ кНМ}, f_{\text{ТР}} = 2/3.$

Задача S-10.12.

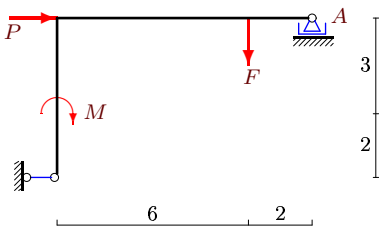
14



$P = 85 \text{ кН}, M = 41 \text{ кНМ}, f_{\text{ТР}} = 1/3.$

Задача S-10.13.

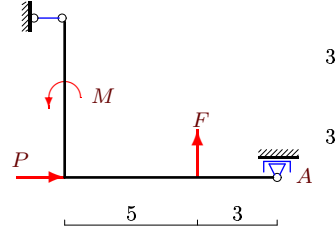
14



$P = 1 \text{ кН}, M = 91 \text{ кНМ}, f_{\text{ТР}} = 2/3.$

Задача S-10.14.

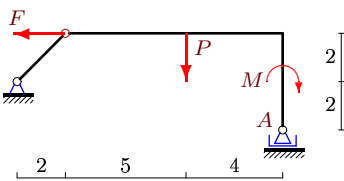
14



$P = 9 \text{ кН}, M = 246 \text{ кНМ}, f_{\text{ТР}} = 3/4.$

Задача S-10.15.

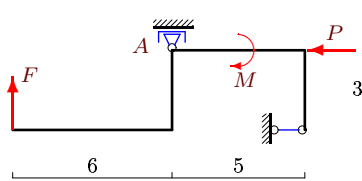
14



$P = 22 \text{ кН}, M = 44 \text{ кНМ}, f_{\text{ТР}} = 1/2.$

Задача S-10.16.

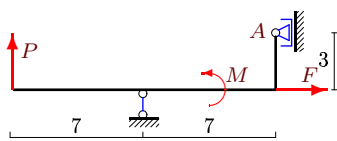
14



$P = 30 \text{ кН}, M = 80 \text{ кНМ}, f_{\text{ТР}} = 4/3.$

Задача S-10.17.

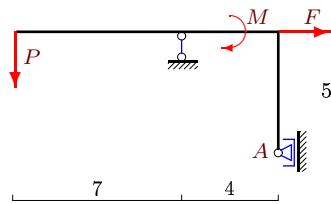
14



$P = 13 \text{ кН}, M = 59 \text{ кНМ}, f_{\text{ТР}} = 1/3.$

Задача S-10.18.

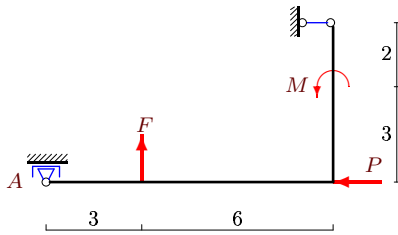
14



$P = 34 \text{ кН}, M = 29 \text{ кНМ}, f_{\text{ТР}} = 1/3.$

Задача S-10.19.

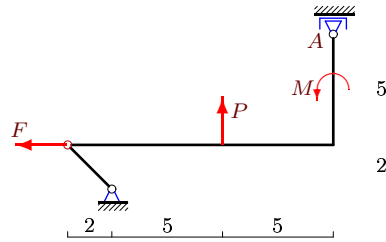
14



$P = 10 \text{ кН}, M = 23 \text{ кНм}, f_{TP} = 3/4.$

Задача S-10.20.

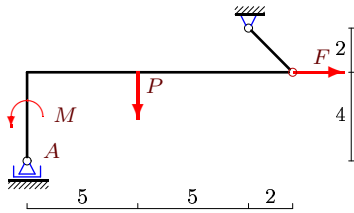
14



$P = 299 \text{ кН}, M = 299 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.21.

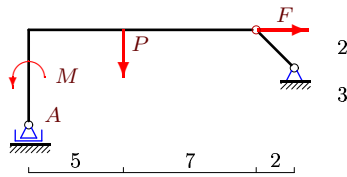
14



$P = 77 \text{ кН}, M = 77 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.22.

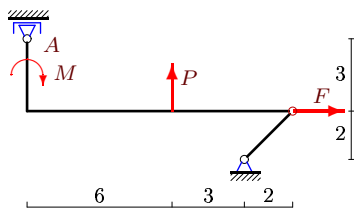
14



$P = 598 \text{ кН}, M = 1196 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.23.

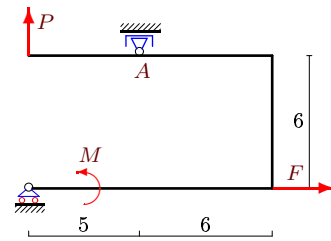
14



$P = 475 \text{ кН}, M = 475 \text{ кНм}, f_{TP} = 1/2.$

Задача S-10.24.

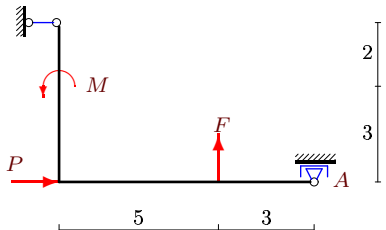
14



$P = 1 \text{ кН}, M = 54 \text{ кНм}, f_{TP} = 2/3.$

Задача S-10.25.

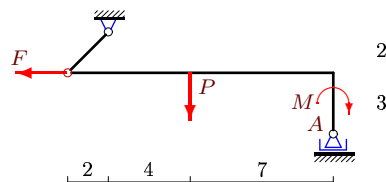
14



$P = 5 \text{ кН}, M = 29 \text{ кНм}, f_{TP} = 3/4.$

Задача S-10.26.

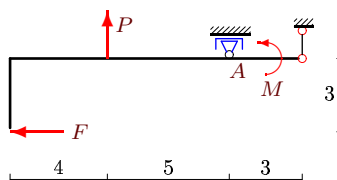
14



$P = 667 \text{ кН}, M = 667 \text{ кНм}, f_{TP} = 1/2.$

Задача S-10.27.

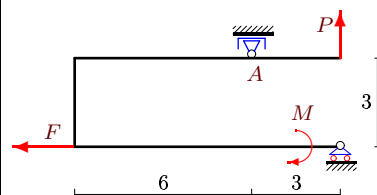
14



$P = 4 \text{ кН}, M = 5 \text{ кНм}, f_{TP} = 4/5.$

Задача S-10.28.

14



$P = 5 \text{ кН}, M = 90 \text{ кНм}, f_{TP} = 2/3.$

**Ответы.****Равновесие рамы с трением**

16.02.2015

№	$F$
1	$-2 < F < 6$ кН
2	$-3 < F < 9$ кН
3	$-189 < F < 323$ кН
4	$-20 < F < 100$ кН
5	$-12 < F < 228$ кН
6	$2 < F < 6$ кН
7	$3 < F < 16$ кН
8	$60 < F < 100$ кН
9	$F > 8$ кН
10	$12 < F < 52$ кН
11	$-44 < F < 196$ кН
12	$39 < F < 69$ кН
13	$F > 18$ кН
14	$F > 40$ кН
15	$-11 < F < 15$ кН
16	$1 < F < 5$ кН
17	$6 < F < 48$ кН
18	$33 < F < 57$ кН
19	$F > 4$ кН
20	$-161 < F < 247$ кН
21	$-33 < F < 63$ кН
22	$-437 < F < 481$ кН
23	$25 < F < 361$ кН
24	$-4 < F < 36$ кН
25	$F > 8$ кН
26	$58 < F < 506$ кН
27	$-4 < F < 36$ кН
28	$-12 < F < 60$ кН

S-10 файл o10s14A