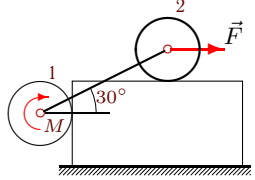
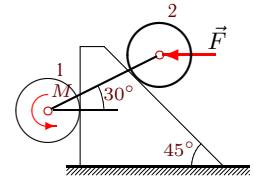
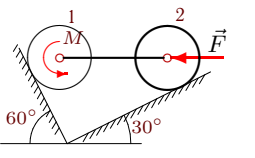
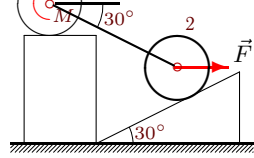
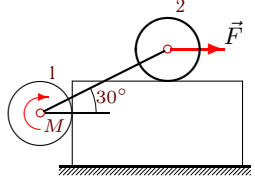
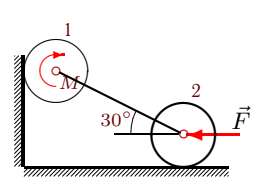
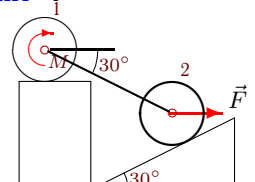
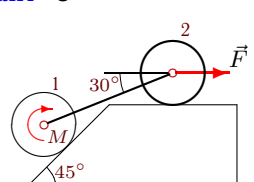
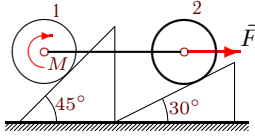
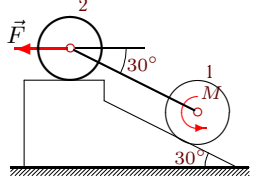


Трение качения

Система состоит из двух цилиндров весом G_1 и G_2 с одинаковыми радиусами R , соединенных однородным стержнем весом G_3 . Цилиндры могут кататься без проскальзывания, цилиндр 1 без сопротивления, а цилиндр 2 с трением качения (δ). В каких пределах меняется внешний момент M при условии равновесия системы?

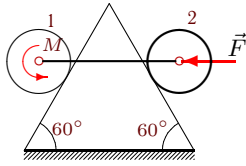
В ответах даны нормальные реакции опор и момент M для движения цилиндра 2 по часовой стрелке и против (последние три столбца).

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<p>Вариант 1 С18.</p>  <p>$P_1 = 25 \text{ Н}, P_2 = 29 \text{ Н}, P_3 = 20 \text{ Н},$ $F = 25 \text{ Н}, R = 45 \text{ см}, \delta = 2 \text{ мм}.$</p>	<p>Вариант 2 С18.</p>  <p>$P_1 = 24 \text{ Н}, P_2 = 27 \text{ Н}, P_3 = 20 \text{ Н},$ $F = 20 \text{ Н}, R = 70 \text{ см}, \delta = 5 \text{ мм}.$</p>
<p>Вариант 3 С18.</p>  <p>$P_1 = 24 \text{ Н}, P_2 = 28 \text{ Н}, P_3 = 50 \text{ Н},$ $F = 20 \text{ Н}, R = 30 \text{ см}, \delta = 1 \text{ мм}.$</p>	<p>Вариант 4 С18.</p>  <p>$P_1 = 25 \text{ Н}, P_2 = 28 \text{ Н}, P_3 = 50 \text{ Н},$ $F = 25 \text{ Н}, R = 55 \text{ см}, \delta = 3 \text{ мм}.$</p>
<p>Вариант 5 С18.</p>  <p>$P_1 = 21 \text{ Н}, P_2 = 24 \text{ Н}, P_3 = 50 \text{ Н},$ $F = 5 \text{ Н}, R = 55 \text{ см}, \delta = 5 \text{ мм}.$</p>	<p>Вариант 6 С18.</p>  <p>$P_1 = 5 \text{ Н}, P_2 = 26 \text{ Н}, P_3 = 10 \text{ Н},$ $F = 30 \text{ Н}, R = 65 \text{ см}, \delta = 5 \text{ мм}.$</p>
<p>Вариант 7 С18.</p>  <p>$P_1 = 25 \text{ Н}, P_2 = 30 \text{ Н}, P_3 = 40 \text{ Н},$ $F = 25 \text{ Н}, R = 65 \text{ см}, \delta = 4 \text{ мм}.$</p>	<p>Вариант 8 С18.</p>  <p>$P_1 = 22 \text{ Н}, P_2 = 26 \text{ Н}, P_3 = 40 \text{ Н},$ $F = 10 \text{ Н}, R = 30 \text{ см}, \delta = 2 \text{ мм}.$</p>
<p>Вариант 9 С18.</p>  <p>$P_1 = 21 \text{ Н}, P_2 = 26 \text{ Н}, P_3 = 10 \text{ Н},$ $F = 5 \text{ Н}, R = 25 \text{ см}, \delta = 2 \text{ мм}.$</p>	<p>Вариант 10 С18.</p>  <p>$P_1 = 21 \text{ Н}, P_2 = 22 \text{ Н}, P_3 = 30 \text{ Н},$ $F = 5 \text{ Н}, R = 55 \text{ см}, \delta = 5 \text{ мм}.$</p>

Вариант 11

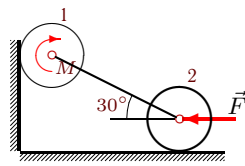
C18.



$P_1 = 12 \text{ H}, P_2 = 29 \text{ H}, P_3 = 30 \text{ H},$
 $F = 20 \text{ H}, R = 70 \text{ см}, \delta = 5 \text{ мм}.$

Вариант 12

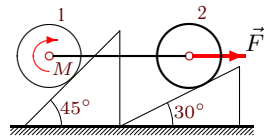
C18.



$P_1 = 6 \text{ H}, P_2 = 30 \text{ H}, P_3 = 40 \text{ H},$
 $F = 50 \text{ H}, R = 65 \text{ см}, \delta = 4 \text{ мм}.$

Вариант 13

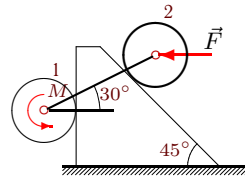
C18.



$P_1 = 23 \text{ H}, P_2 = 24 \text{ H}, P_3 = 10 \text{ H},$
 $F = 15 \text{ H}, R = 25 \text{ см}, \delta = 1 \text{ мм}.$

Вариант 14

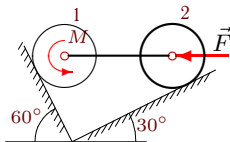
C18.



$P_1 = 24 \text{ H}, P_2 = 29 \text{ H}, P_3 = 40 \text{ H},$
 $F = 20 \text{ H}, R = 60 \text{ см}, \delta = 4 \text{ мм}.$

Вариант 15

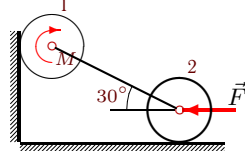
C18.



$P_1 = 25 \text{ H}, P_2 = 29 \text{ H}, P_3 = 10 \text{ H},$
 $F = 25 \text{ H}, R = 55 \text{ см}, \delta = 3 \text{ мм}.$

Вариант 16

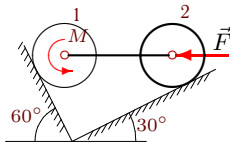
C18.



$P_1 = 5 \text{ H}, P_2 = 26 \text{ H}, P_3 = 30 \text{ H},$
 $F = 10 \text{ H}, R = 35 \text{ см}, \delta = 3 \text{ мм}.$

Вариант 17

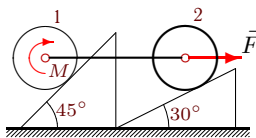
C18.



$P_1 = 22 \text{ H}, P_2 = 23 \text{ H}, P_3 = 50 \text{ H},$
 $F = 10 \text{ H}, R = 30 \text{ см}, \delta = 2 \text{ мм}.$

Вариант 18

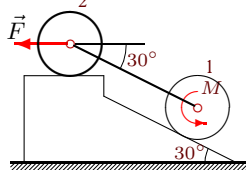
C18.



$P_1 = 23 \text{ H}, P_2 = 28 \text{ H}, P_3 = 30 \text{ H},$
 $F = 15 \text{ H}, R = 35 \text{ см}, \delta = 2 \text{ мм}.$

Вариант 19

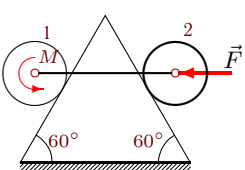
C18.



$P_1 = 23 \text{ H}, P_2 = 27 \text{ H}, P_3 = 10 \text{ H},$
 $F = 15 \text{ H}, R = 55 \text{ см}, \delta = 4 \text{ мм}.$

Вариант 20

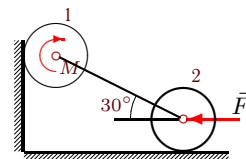
C18.



$P_1 = 10 \text{ H}, P_2 = 23 \text{ H}, P_3 = 50 \text{ H},$
 $F = 5 \text{ H}, R = 45 \text{ см}, \delta = 4 \text{ мм}.$

Вариант 21

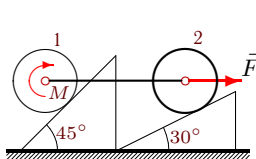
C18.



$P_1 = 5 \text{ H}, P_2 = 25 \text{ H}, P_3 = 40 \text{ H},$
 $F = 20 \text{ H}, R = 50 \text{ см}, \delta = 4 \text{ мм}.$

Вариант 22

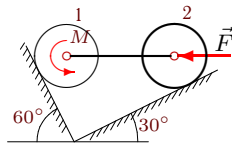
C18.



$P_1 = 22 \text{ H}, P_2 = 24 \text{ H}, P_3 = 10 \text{ H},$
 $F = 10 \text{ H}, R = 60 \text{ см}, \delta = 5 \text{ мм}.$

Вариант 23

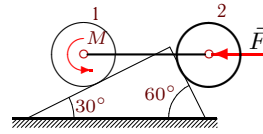
C18.



$P_1 = 25 \text{ H}, P_2 = 30 \text{ H}, P_3 = 40 \text{ H},$
 $F = 25 \text{ H}, R = 75 \text{ см}, \delta = 5 \text{ мм}.$

Вариант 24

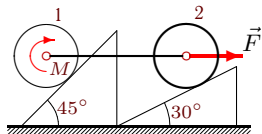
C18.



$P_1 = 22 \text{ H}, P_2 = 25 \text{ H}, P_3 = 50 \text{ H},$
 $F = 10 \text{ H}, R = 40 \text{ см}, \delta = 3 \text{ мм}.$

Вариант 25

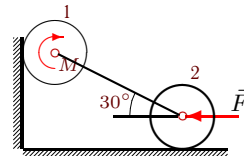
C18.



$P_1 = 21 \text{ H}, P_2 = 22 \text{ H}, P_3 = 20 \text{ H},$
 $F = 5 \text{ H}, R = 35 \text{ см}, \delta = 3 \text{ мм}.$

Вариант 26

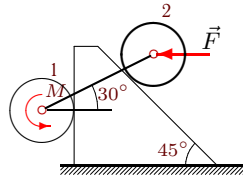
C18.



$P_1 = 6 \text{ H}, P_2 = 27 \text{ H}, P_3 = 30 \text{ H},$
 $F = 50 \text{ H}, R = 75 \text{ см}, \delta = 5 \text{ мм}.$

Вариант 27

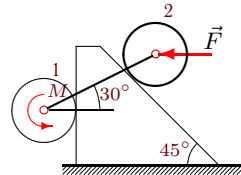
C18.



$P_1 = 22 \text{ H}, P_2 = 26 \text{ H}, P_3 = 20 \text{ H},$
 $F = 10 \text{ H}, R = 50 \text{ см}, \delta = 4 \text{ мм}.$

Вариант 28

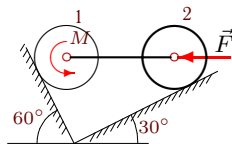
C18.



$P_1 = 21 \text{ H}, P_2 = 22 \text{ H}, P_3 = 40 \text{ H},$
 $F = 5 \text{ H}, R = 25 \text{ см}, \delta = 2 \text{ мм}.$

Вариант 29

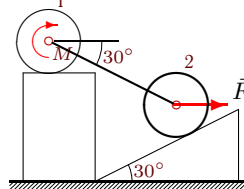
C18.



$P_1 = 25 \text{ H}, P_2 = 26 \text{ H}, P_3 = 40 \text{ H},$
 $F = 25 \text{ H}, R = 75 \text{ см}, \delta = 5 \text{ мм}.$

Вариант 30

C18.



$P_1 = 21 \text{ H}, P_2 = 22 \text{ H}, P_3 = 50 \text{ H},$
 $F = 5 \text{ H}, R = 25 \text{ см}, \delta = 2 \text{ мм}.$

Ответы

	N_1	N_2	M	N_1	N_2	M
	H		Hm	H		Hm
1	24.763	53.297	9.316	25.238	53.571	9.193
2	38.240	82.956	-8.346	42.314	87.500	-6.699
3	68.525	61.317	5.105	68.117	61.082	5.176
4	44.783	67.436	4.970	45.512	66.174	4.276
5	4.531	51.616	23.861	5.474	52.161	23.562
6	30.373	48.536	4.898	29.630	48.107	4.619
7	41.267	62.266	4.202	42.026	60.953	3.349
8	32.584	51.575	5.679	32.791	51.974	5.448
9	9.030	35.962	6.935	9.497	35.631	6.818
10	31.177	40.097	6.493	31.177	39.678	6.954
11	61.104	86.925	2.871	63.282	89.102	3.751
12	50.487	79.149	2.047	49.516	78.588	1.682
13	18.457	33.564	5.285	18.676	33.409	5.231
14	65.887	122.278	-3.576	71.482	128.518	-1.638
15	53.865	39.384	1.948	53.437	39.137	2.084
16	10.403	47.006	-4.898	9.601	46.543	-5.060
17	56.531	55.640	6.490	55.792	55.213	6.618
18	19.690	49.816	11.918	20.153	49.489	11.756
19	24.249	40.832	-2.015	24.249	40.490	-1.639
20	83.714	94.544	3.563	86.671	97.501	4.331
21	20.454	56.809	-6.595	19.550	56.287	-6.856
22	14.095	33.648	14.453	14.551	33.326	14.180
23	69.537	57.958	8.861	68.767	57.514	9.194
24	78.264	98.718	16.623	79.764	101.316	17.662
25	12.132	37.134	11.098	12.649	36.768	10.917
26	50.474	71.141	6.106	49.529	70.596	5.697
27	58.888	98.208	0.999	64.307	104.252	2.564
28	84.141	127.081	1.895	91.154	134.903	2.907
29	67.506	53.321	9.740	66.798	52.913	10.047
30	26.210	77.480	8.569	27.433	75.362	8.040