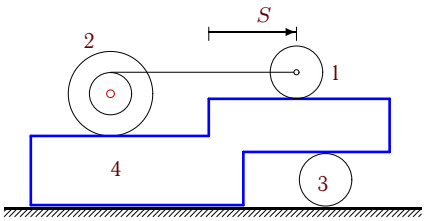
Теорема о центре масс системы

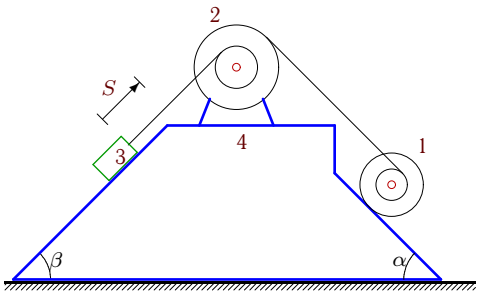
Механизм, состоящий из трех тел, установлен на призме, скользящей по гладкой плоскости. Нити, соединяющие тела, параллельны плоскостям. Под действием внутренних сил из состояния покоя механизм пришел в движение. Центр цилиндра (блока) или бруска сместился относительно призмы на расстояние S. Найти смещение призмы. Массы даны в килограммах, радиусы и смещение — в сантиметрах.

Задача D4.1. 4



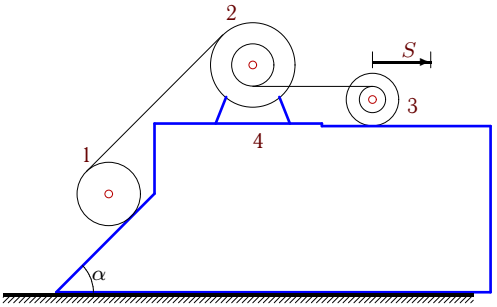
$R_2 = 3,\quad r_2 = 2,\quad m_1 = 13,\quad m_2 = 3,\quad m_3 = 24,$
$m_4 = 15,\ S = 86.$

Задача D4.2. 4



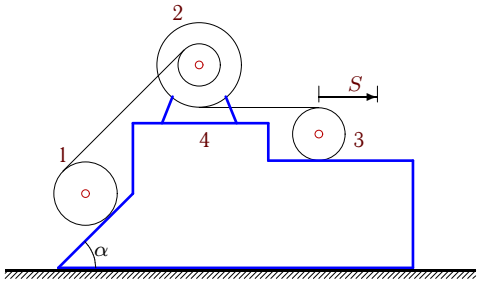
$R_1 = 5,\ r_1 = 3,\ R_2 = 5,\ r_2 = 3,\ m_1 = 6,\ m_2 = 12,$
$m_3 = 10,\ m_4 = 15,\ S = 129,\ \cos\alpha = \cos\beta = 0{,}8.$

Задача D4.3. 4



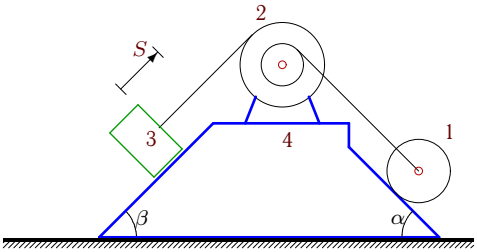
$R_2 = 4,\ r_2 = 3,\ R_3 = 4,\ r_3 = 2,\ m_1 = 2,\ m_2 = 12,$
$m_3 = 15,\ m_4 = 10,\ S = 117,\ \alpha = \pi/3.$

Задача D4.4. 4



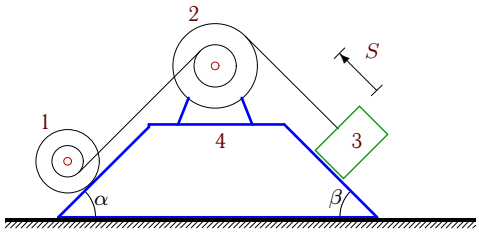
$R_2 = 5,\quad r_2 = 3,\quad m_1 = 25,\quad m_2 = 12,\quad m_3 = 12,$
$m_4 = 12,\ S = 122,\ \cos\alpha = 0{,}6.$

Задача D4.5. 4



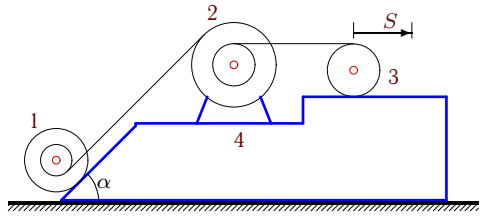
$R_2 = 5,\quad r_2 = 3,\quad m_1 = 25,\quad m_2 = 10,\quad m_3 = 4,$
$m_4 = 12,\ S = 51,\ \cos\alpha = 0{,}8,\ \beta = \pi/3.$

Задача D4.6. 4



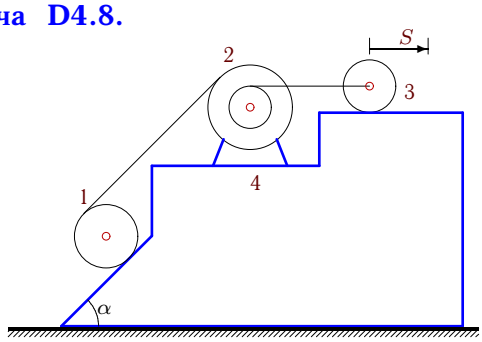
$R_1 = 4,\ r_1 = 3,\ R_2 = 4,\ r_2 = 2,\ m_1 = 10,\ m_2 = 13,$
$m_3 = 6,\ m_4 = 15,\ S = 132,\ \cos\alpha = 0{,}6,\ \beta = \pi/3.$

Задача D4.7.



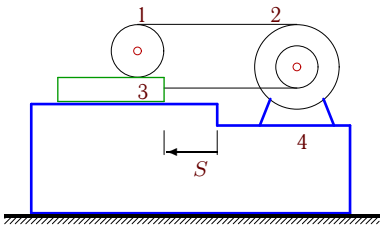
$R_1 = 3,\ r_1 = 2,\ R_2 = 4,\ r_2 = 2,\ m_1 = 1,\ m_2 = 13,\ m_3 = 10,\ m_4 = 12,\ S = 36,\ \alpha = \pi/3.$

Задача D4.8.



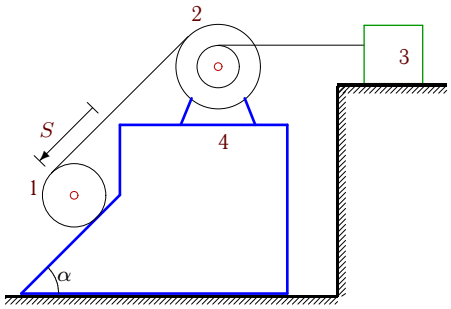
$R_2 = 5,\quad r_2 = 3,\quad m_1 = 12,\quad m_2 = 12,\quad m_3 = 15,\ m_4 = 15,\ S = 108,\ \alpha = \pi/3.$

Задача D4.9.



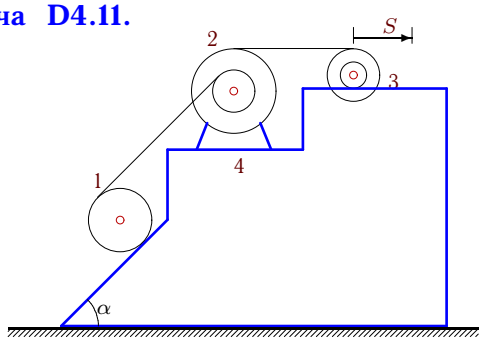
$R_2 = 3,\quad r_2 = 2,\quad m_1 = 4,\quad m_2 = 15,\quad m_3 = 10,\ m_4 = 10,\ S = 117.$

Задача D4.10.



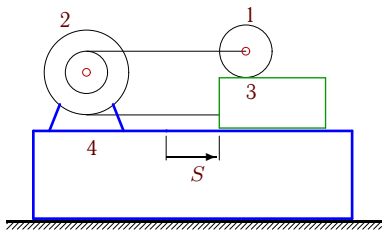
$R_2 = 4,\quad r_2 = 2,\quad m_1 = 5,\quad m_2 = 10,\quad m_3 = 2,\ m_4 = 15,\ S = 64,\ \cos\alpha = 0{,}6.$

Задача D4.11.



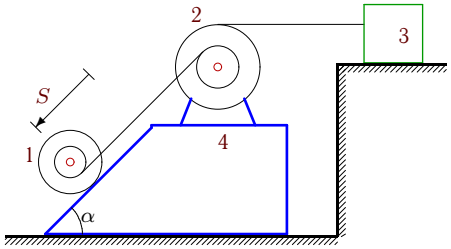
$R_2 = 5,\ r_2 = 3,\ R_3 = 5,\ r_3 = 3,\ m_1 = 5,\ m_2 = 12,\ m_3 = 15,\ m_4 = 12,\ S = 88,\ \alpha = \pi/3.$

Задача D4.12.



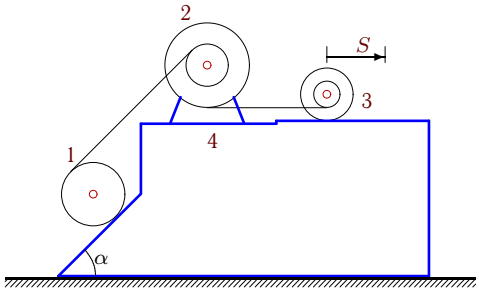
$R_2 = 3,\quad r_2 = 2,\quad m_1 = 3,\quad m_2 = 12,\quad m_3 = 13,\ m_4 = 13,\ S = 123.$

Задача D4.13.



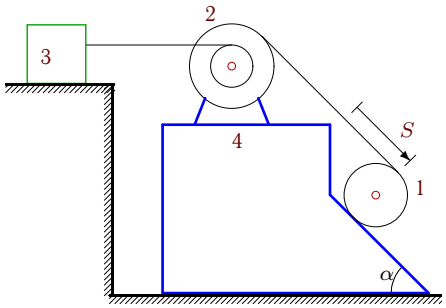
$R_1 = 4,\ r_1 = 2,\ R_2 = 4,\ r_2 = 3,\ m_1 = 10,\ m_2 = 15,\ m_3 = 3,\ m_4 = 13,\ S = 82,\ \cos\alpha = 0{,}6.$

Задача D4.14.



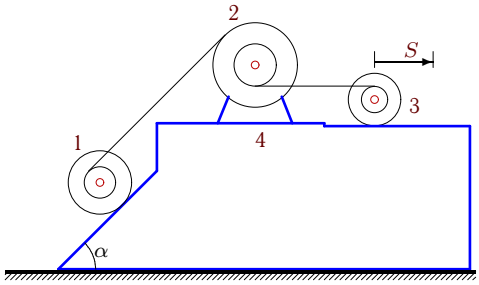
$R_2 = 4,\ r_2 = 3,\ R_3 = 3,\ r_3 = 2,\ m_1 = 16,\ m_2 = 15,\ m_3 = 12,\ m_4 = 10,\ S = 159,\ \alpha = \pi/3.$

Задача D4.15.



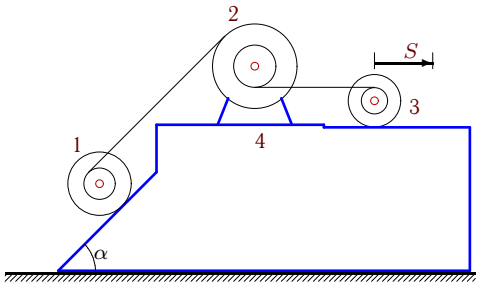
$R_2 = 3$, $r_2 = 2$, $m_1 = 5$, $m_2 = 12$, $m_3 = 6$, $m_4 = 10$, $S = 66$, $\cos\alpha = 0{,}8$.

Задача D4.16.



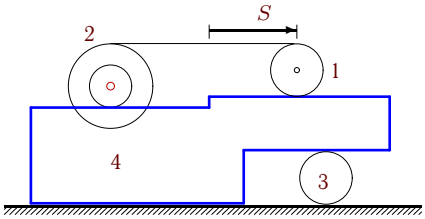
$R_1 = 4$, $r_1 = 2$, $R_2 = 4$, $r_2 = 3$, $R_3 = 5$, $r_3 = 3$, $m_1 = 45$, $m_2 = 15$, $m_3 = 15$, $m_4 = 13$, $S = 264$, $\alpha = \pi/3$.

Задача D4.17.



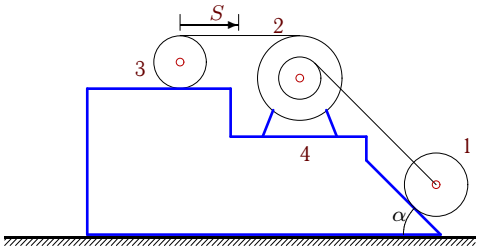
$R_1 = 4$, $r_1 = 3$, $R_2 = 5$, $r_2 = 3$, $R_3 = 4$, $r_3 = 2$, $m_1 = 7$, $m_2 = 10$, $m_3 = 15$, $m_4 = 15$, $S = 141$, $\alpha = \pi/3$.

Задача D4.18.



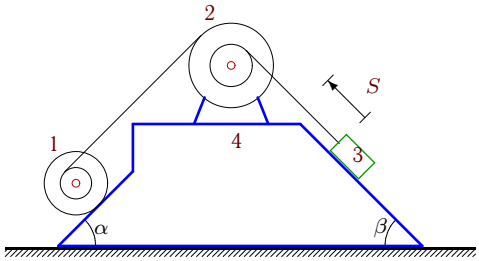
$R_2 = 5$, $r_2 = 3$, $m_1 = 15$, $m_2 = 8$, $m_3 = 20$, $m_4 = 12$, $S = 180$.

Задача D4.19.



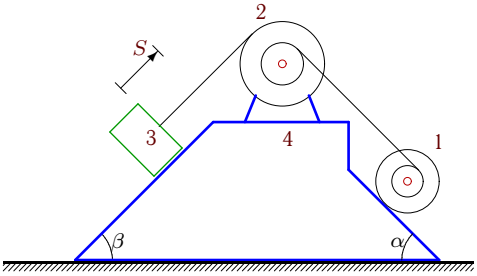
$R_2 = 4$, $r_2 = 3$, $m_1 = 5$, $m_2 = 10$, $m_3 = 15$, $m_4 = 10$, $S = 80$, $\cos\alpha = 0{,}8$.

Задача D4.20.



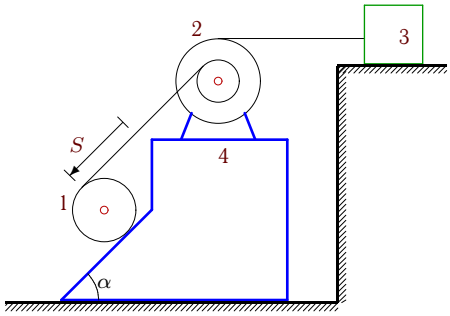
$R_1 = 3$, $r_1 = 2$, $R_2 = 4$, $r_2 = 2$, $m_1 = 50$, $m_2 = 10$, $m_3 = 4$, $m_4 = 15$, $S = 79$, $\cos\alpha = 0{,}6$, $\beta = \pi/3$.

Задача D4.21.



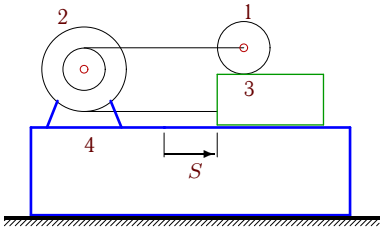
$R_1 = 4$, $r_1 = 2$, $R_2 = 4$, $r_2 = 2$, $m_1 = 15$, $m_2 = 15$, $m_3 = 6$, $m_4 = 12$, $S = 144$, $\cos\alpha = 0{,}8$, $\beta = \pi/3$.

Задача D4.22.



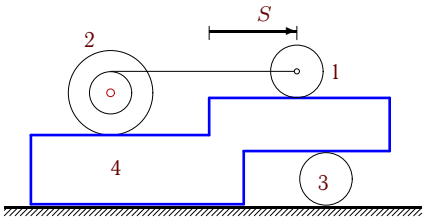
$R_2 = 3$, $r_2 = 2$, $m_1 = 2$, $m_2 = 12$, $m_3 = 2$, $m_4 = 10$, $S = 52$, $\alpha = \pi/3$.

Задача D4.23.



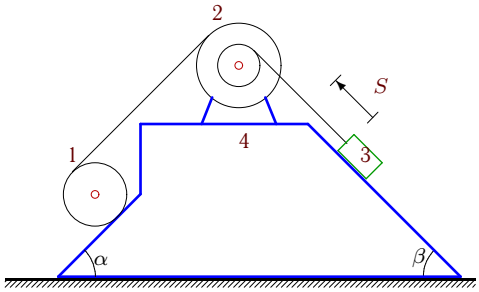
$R_2 = 5$, $r_2 = 3$, $m_1 = 5$, $m_2 = 15$, $m_3 = 15$, $m_4 = 12$, $S = 141$.

Задача D4.24.



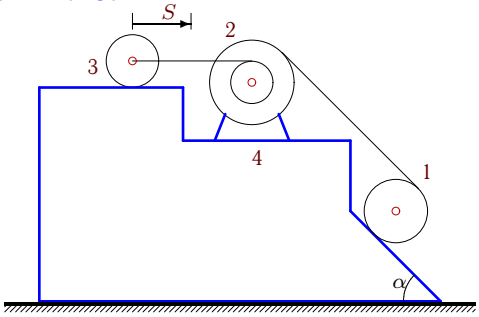
$R_2 = 5$, $r_2 = 3$, $m_1 = 15$, $m_2 = 5$, $m_3 = 24$, $m_4 = 12$, $S = 176$.

Задача D4.25.



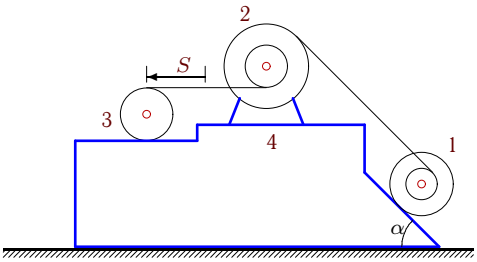
$R_2 = 5$, $r_2 = 3$, $m_1 = 4$, $m_2 = 12$, $m_3 = 4$, $m_4 = 15$, $S = 70$, $\cos\alpha = 0{,}6$, $\beta = \pi/3$.

Задача D4.26.



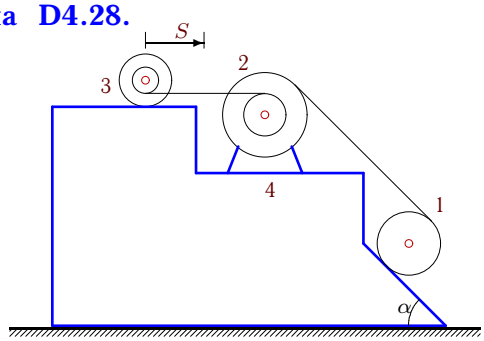
$R_2 = 5$, $r_2 = 3$, $m_1 = 3$, $m_2 = 13$, $m_3 = 12$, $m_4 = 12$, $S = 80$, $\cos\alpha = 0{,}8$.

Задача D4.27.



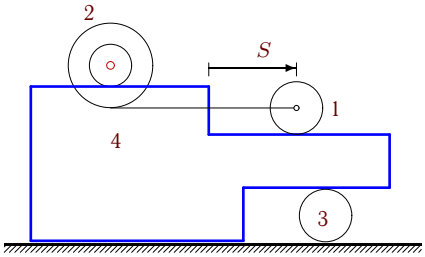
$R_1 = 4$, $r_1 = 2$, $R_2 = 4$, $r_2 = 3$, $m_1 = 45$, $m_2 = 15$, $m_3 = 15$, $m_4 = 10$, $S = 255$, $\cos\alpha = 0{,}8$.

Задача D4.28.



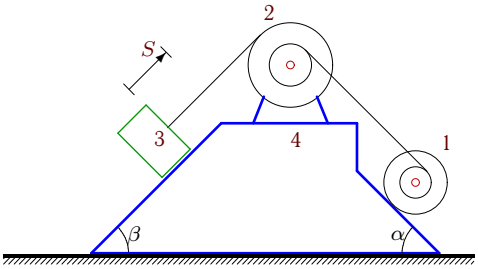
$R_2 = 4$, $r_2 = 2$, $R_3 = 4$, $r_3 = 3$, $m_1 = 5$, $m_2 = 15$, $m_3 = 10$, $m_4 = 12$, $S = 168$, $\cos\alpha = 0{,}8$.

Задача D4.29.



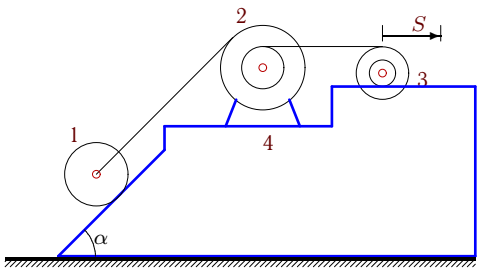
$R_2 = 4$, $r_2 = 3$, $m_1 = 12$, $m_2 = 8$, $m_3 = 26$, $m_4 = 15$, $S = 96$.

Задача D4.30.



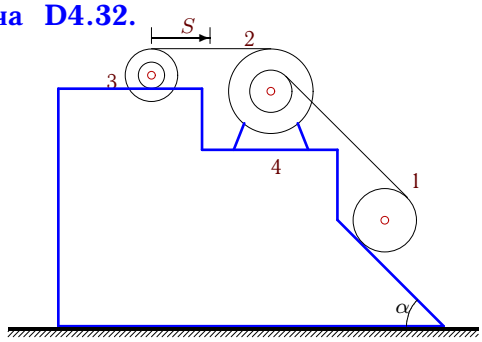
$R_1 = 4$, $r_1 = 2$, $R_2 = 4$, $r_2 = 2$, $m_1 = 30$, $m_2 = 15$, $m_3 = 8$, $m_4 = 12$, $S = 195$, $\cos\alpha = 0{,}8$, $\beta = \pi/3$.

Задача D4.31.



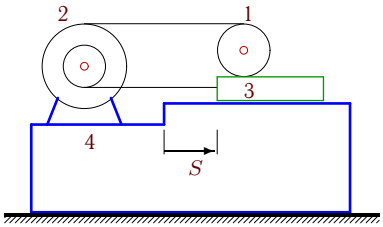
$R_2 = 4$, $r_2 = 3$, $R_3 = 4$, $r_3 = 3$, $m_1 = 15$, $m_2 = 12$, $m_3 = 15$, $m_4 = 13$, $S = 165$, $\cos\alpha = 0{,}6$.

Задача D4.32.



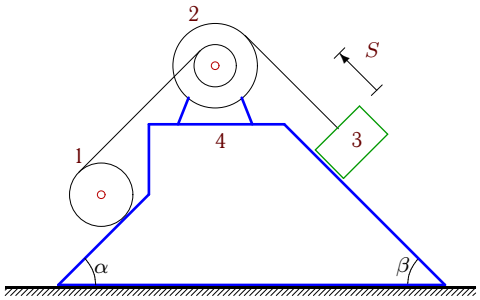
$R_2 = 4$, $r_2 = 2$, $R_3 = 4$, $r_3 = 3$, $m_1 = 15$, $m_2 = 10$, $m_3 = 10$, $m_4 = 12$, $S = 94$, $\cos\alpha = 0{,}8$.

Задача D4.33.



$R_2 = 4$, $r_2 = 2$, $m_1 = 4$, $m_2 = 13$, $m_3 = 13$, $m_4 = 12$, $S = 84$.

Задача D4.34.



$R_2 = 3$, $r_2 = 2$, $m_1 = 12$, $m_2 = 12$, $m_3 = 6$, $m_4 = 13$, $S = 129$, $\alpha = \beta = \pi/3$.

D4 Ответы.
Теорема о центре масс системы 26.08.2012

№	Δ_4
1	32
2	39
3	42
4	6
5	14
6	45
7	16
8	40
9	27
10	10
11	34
12	33
13	16
14	33
15	24
16	51
17	30
18	100
19	42
20	38
21	21
22	14
23	36
24	80
25	8
26	28
27	147
28	44
29	32
30	36
31	129
32	34
33	22
34	15

D4 файл o4d4A