

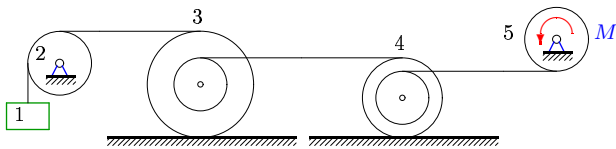
# Кинетическая энергия системы. Приведенные массы

Механическая система, состоящая из пяти тел 1, 2, 3, 4 и 5, движется под действием внешних сил. Заданы радиусы цилиндров и блоков. Радиусы инерции  $\rho$  даны для блоков, цилиндры считать однородными. Горизонтальный стержень, находящийся в зацеплении с блоками, считать невесомым. Массы даны в килограммах, радиусы — в сантиметрах. Вычислить приведенную массу системы  $\mu$  в формуле  $T = \mu v_1^2/2$ , где  $v_1$  — скорость груза 1 (или центра цилиндра 1).

Кирсанов М.Н. Задачи по теоретической механике с решениями в **Maple** 11. — М.: ФИЗМАТЛИТ, 2010. — 264 с. (с.111)

### Задача D-33.1.

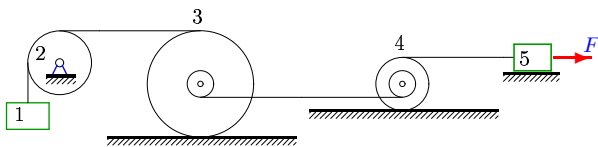
1



$$\begin{aligned} R_3 &= 4, r_3 = 2, \rho_3 = 3, \\ R_4 &= 3, r_4 = 2, \rho_4 = 2, \\ m_1 &= 4, m_2 = 2, \\ m_3 &= 320, m_4 = 256, \\ m_5 &= 128. \end{aligned}$$

### Задача D-33.2.

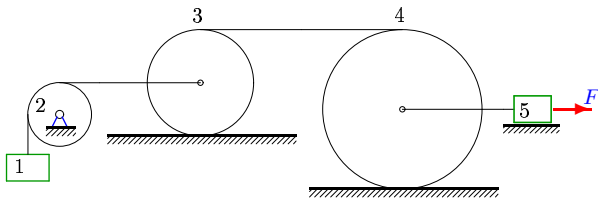
1



$$\begin{aligned} R_3 &= 4, r_3 = 1, \rho_3 = 3, \\ R_4 &= 2, r_4 = 1, \rho_4 = 1, \\ m_1 &= 5, m_2 = 12, \\ m_3 &= 256, m_4 = 192, \\ m_5 &= 8. \end{aligned}$$

### Задача D-33.3.

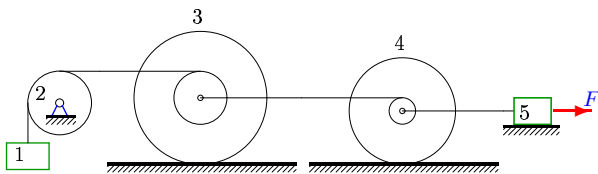
1



$$\begin{aligned} R_3 &= 4, \\ R_4 &= 6, \\ m_1 &= 7, m_2 = 6, \\ m_3 &= 8, m_4 = 6, \\ m_5 &= 2. \end{aligned}$$

### Задача D-33.4.

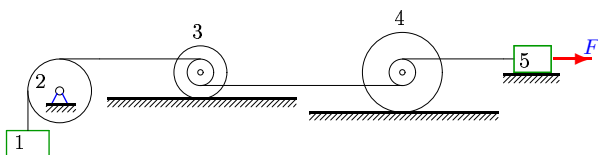
1



$$\begin{aligned} R_3 &= 5, r_3 = 2, \rho_3 = 4, \\ R_4 &= 4, r_4 = 1, \rho_4 = 3, \\ m_1 &= 9, m_2 = 6, \\ m_3 &= 196, m_4 = 147, \\ m_5 &= 98. \end{aligned}$$

### Задача D-33.5.

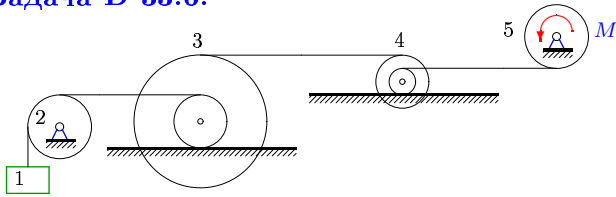
1



$$\begin{aligned} R_3 &= 2, r_3 = 1, \rho_3 = 1, \\ R_4 &= 3, r_4 = 1, \rho_4 = 2, \\ m_1 &= 15, m_2 = 10, \\ m_3 &= 72, m_4 = 252, \\ m_5 &= 54. \end{aligned}$$

Задача D-33.6.

1



$$R_3 = 5, r_3 = 2, \rho_3 = 4,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

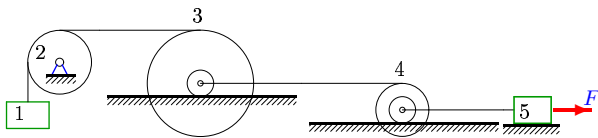
$$m_1 = 13, m_2 = 12,$$

$$m_3 = 16, m_4 = 216,$$

$$m_5 = 144.$$

Задача D-33.7.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

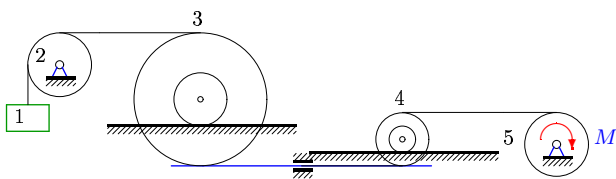
$$m_1 = 15, m_2 = 12,$$

$$m_3 = 20, m_4 = 225,$$

$$m_5 = 225.$$

Задача D-33.8.

1



$$R_3 = 5, r_3 = 2, \rho_3 = 4,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

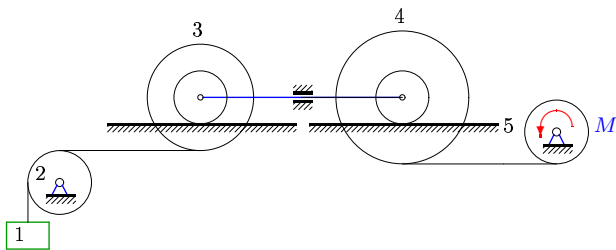
$$m_1 = 17, m_2 = 2,$$

$$m_3 = 196, m_4 = 147,$$

$$m_5 = 196.$$

Задача D-33.9.

1



$$R_3 = 4, r_3 = 2, \rho_3 = 3,$$

$$R_4 = 5, r_4 = 2, \rho_4 = 4,$$

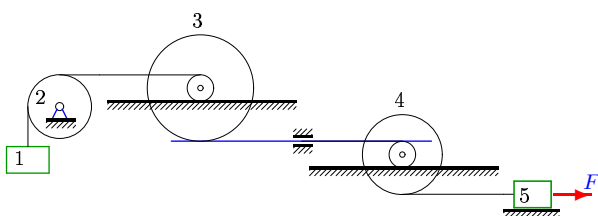
$$m_1 = 19, m_2 = 8,$$

$$m_3 = 16, m_4 = 3,$$

$$m_5 = 16.$$

Задача D-33.10.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 3, r_4 = 1, \rho_4 = 2,$$

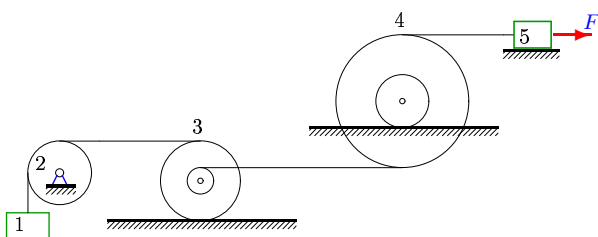
$$m_1 = 21, m_2 = 10,$$

$$m_3 = 8, m_4 = 48,$$

$$m_5 = 8.$$

Задача D-33.11.

1



$$R_3 = 3, r_3 = 1, \rho_3 = 2,$$

$$R_4 = 5, r_4 = 2, \rho_4 = 4,$$

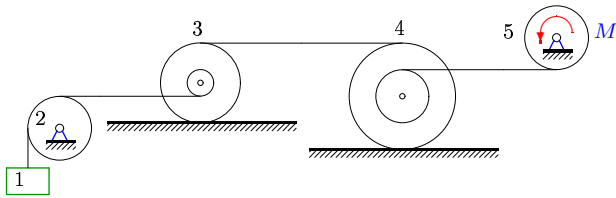
$$m_1 = 10, m_2 = 6,$$

$$m_3 = 144, m_4 = 243,$$

$$m_5 = 81.$$

Задача D-33.12.

1



$$R_3 = 3, r_3 = 1, \rho_3 = 2,$$

$$R_4 = 4, r_4 = 2, \rho_4 = 3,$$

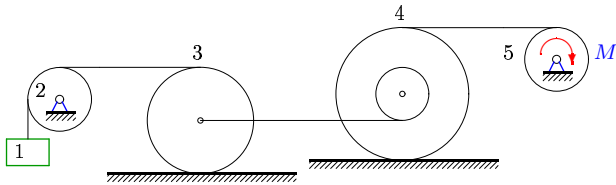
$$m_1 = 4, m_2 = 4,$$

$$m_3 = 16, m_4 = 64,$$

$$m_5 = 64.$$

Задача D-33.13.

1



$$R_3 = 4,$$

$$R_4 = 5, r_4 = 2, \rho_4 = 4,$$

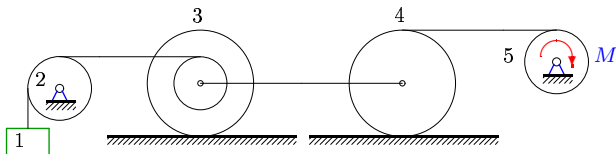
$$m_1 = 6, m_2 = 8,$$

$$m_3 = 32, m_4 = 108,$$

$$m_5 = 36.$$

Задача D-33.14.

1



$$R_3 = 4, r_3 = 2, \rho_3 = 3,$$

$$R_4 = 4,$$

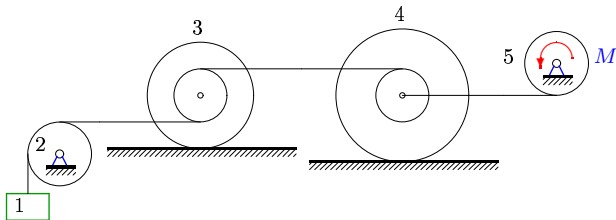
$$m_1 = 8, m_2 = 12,$$

$$m_3 = 144, m_4 = 9,$$

$$m_5 = 36.$$

Задача D-33.15.

1



$$R_3 = 4, r_3 = 2, \rho_3 = 3,$$

$$R_4 = 5, r_4 = 2, \rho_4 = 4,$$

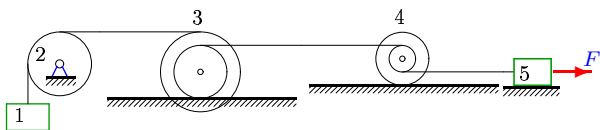
$$m_1 = 10, m_2 = 6,$$

$$m_3 = 16, m_4 = 49,$$

$$m_5 = 98.$$

Задача D-33.16.

1



$$R_3 = 3, r_3 = 2, \rho_3 = 2,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

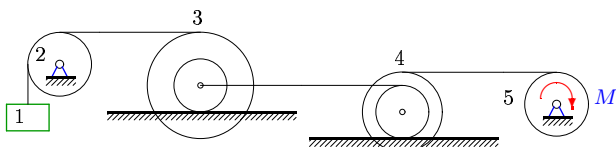
$$m_1 = 12, m_2 = 12,$$

$$m_3 = 100, m_4 = 135,$$

$$m_5 = 225.$$

Задача D-33.17.

1



$$R_3 = 4, r_3 = 2, \rho_3 = 3,$$

$$R_4 = 3, r_4 = 2, \rho_4 = 2,$$

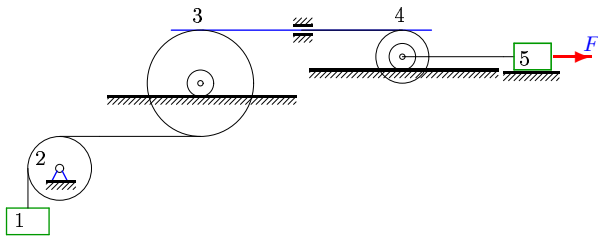
$$m_1 = 14, m_2 = 12,$$

$$m_3 = 144, m_4 = 54,$$

$$m_5 = 288.$$

Задача D-33.18.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

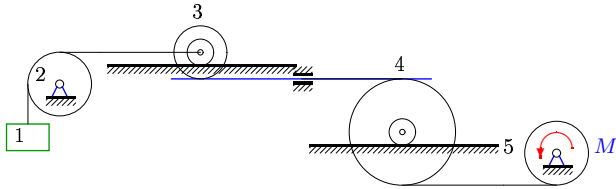
$$m_1 = 16, m_2 = 2,$$

$$m_3 = 36, m_4 = 243,$$

$$m_5 = 162.$$

Задача D-33.19.

1



$$R_3 = 2, r_3 = 1, \rho_3 = 1,$$

$$R_4 = 4, r_4 = 1, \rho_4 = 3,$$

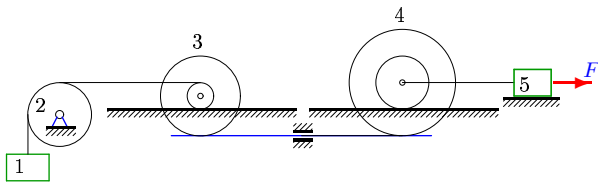
$$m_1 = 18, m_2 = 6,$$

$$m_3 = 4, m_4 = 15,$$

$$m_5 = 100.$$

Задача D-33.20.

1



$$R_3 = 3, r_3 = 1, \rho_3 = 2,$$

$$R_4 = 4, r_4 = 2, \rho_4 = 3,$$

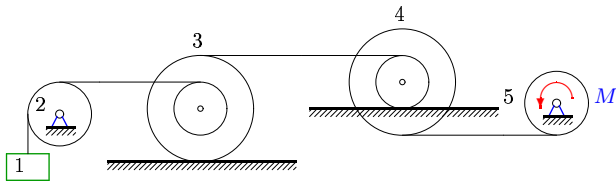
$$m_1 = 20, m_2 = 10,$$

$$m_3 = 16, m_4 = 12,$$

$$m_5 = 2.$$

Задача D-33.21.

1



$$R_3 = 4, r_3 = 2, \rho_3 = 3,$$

$$R_4 = 4, r_4 = 2, \rho_4 = 3,$$

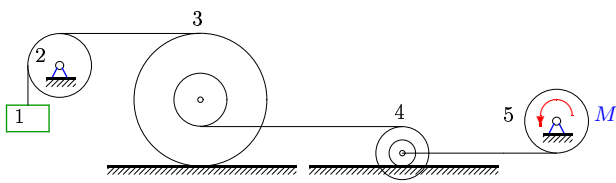
$$m_1 = 13, m_2 = 4,$$

$$m_3 = 180, m_4 = 36,$$

$$m_5 = 54.$$

Задача D-33.22.

1



$$R_3 = 5, r_3 = 2, \rho_3 = 4,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

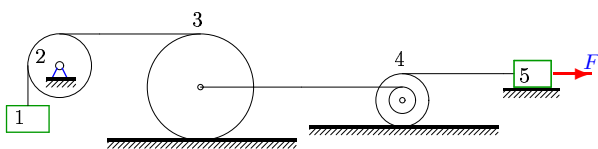
$$m_1 = 10, m_2 = 2,$$

$$m_3 = 100, m_4 = 150,$$

$$m_5 = 200.$$

Задача D-33.23.

1



$$R_3 = 4,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

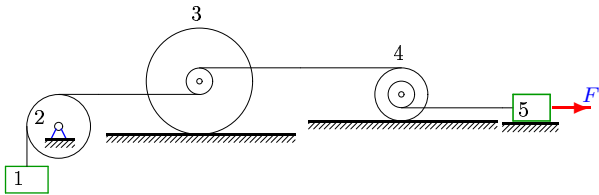
$$m_1 = 5, m_2 = 2,$$

$$m_3 = 32, m_4 = 108,$$

$$m_5 = 18.$$

Задача D-33.24.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

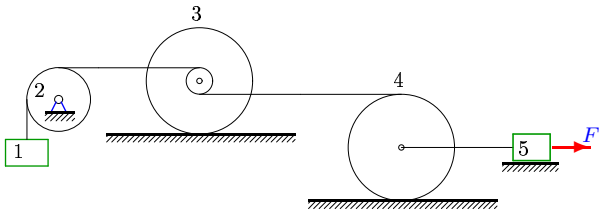
$$m_1 = 8, m_2 = 2,$$

$$m_3 = 36, m_4 = 144,$$

$$m_5 = 144.$$

Задача D-33.25.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 4,$$

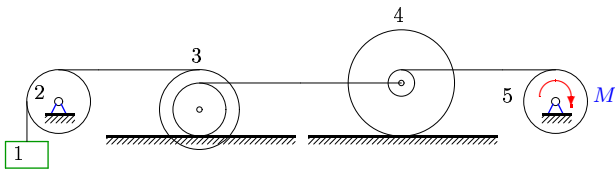
$$m_1 = 9, m_2 = 10,$$

$$m_3 = 4, m_4 = 200,$$

$$m_5 = 100.$$

Задача D-33.26.

1



$$R_3 = 3, r_3 = 2, \rho_3 = 2,$$

$$R_4 = 4, r_4 = 1, \rho_4 = 3,$$

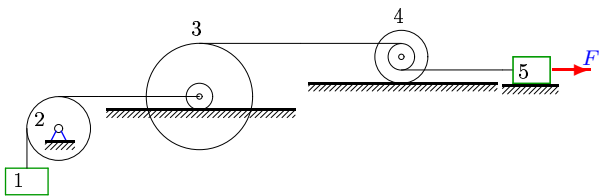
$$m_1 = 14, m_2 = 6,$$

$$m_3 = 175, m_4 = 6,$$

$$m_5 = 10.$$

Задача D-33.27.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

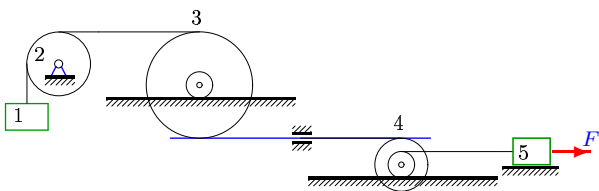
$$m_1 = 13, m_2 = 2,$$

$$m_3 = 4, m_4 = 9,$$

$$m_5 = 18.$$

Задача D-33.28.

1



$$R_3 = 4, r_3 = 1, \rho_3 = 3,$$

$$R_4 = 2, r_4 = 1, \rho_4 = 1,$$

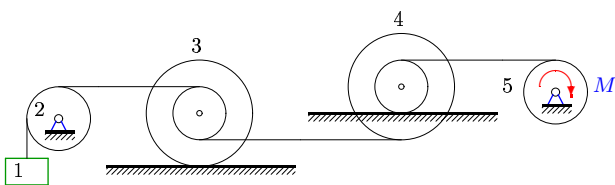
$$m_1 = 15, m_2 = 12,$$

$$m_3 = 20, m_4 = 75,$$

$$m_5 = 50.$$

Задача D-33.29.

1



$$R_3 = 4, r_3 = 2, \rho_3 = 3,$$

$$R_4 = 4, r_4 = 2, \rho_4 = 3,$$

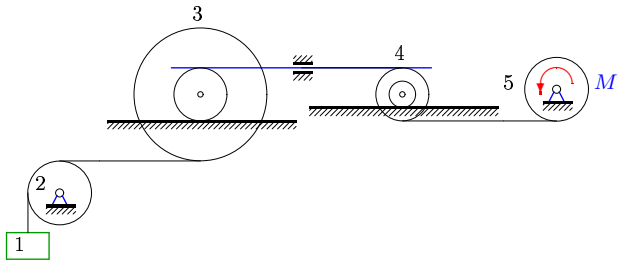
$$m_1 = 17, m_2 = 4,$$

$$m_3 = 180, m_4 = 144,$$

$$m_5 = 54.$$

Задача D-33.30.

1



$$\begin{aligned} R_3 &= 5, r_3 = 2, \rho_3 = 4, \\ R_4 &= 2, r_4 = 1, \rho_4 = 1, \\ m_1 &= 19, m_2 = 12, \\ m_3 &= 36, m_4 = 243, \\ m_5 &= 162. \end{aligned}$$

D-33

**Ответы.**

**Кинетическая энергия системы. Приведенные массы** 01.12.2014

№	$\mu_1$	$\mu_2$	$\mu_3$	$\mu_4$	$\mu_5$	$\sum \mu_k$
1	4	1	125	52	25	207
2	5	6	100	135	18	264
3	7	3	12	9	2	33
4	9	3	164	75	32	283
5	15	5	40	91	24	175
6	13	6	20	147	98	284
7	15	6	8	2	1	32
8	17	1	80	54	162	314
9	19	4	52	15	18	108
10	21	5	20	135	18	199
11	10	3	52	240	196	501
12	4	2	52	225	162	445
13	6	4	12	123	50	195
14	8	6	100	6	32	152
15	10	3	100	369	225	707
16	12	6	32	48	16	114
17	14	6	52	3	25	100
18	16	1	40	150	50	257
19	18	3	8	6	18	53
20	20	5	20	39	2	86
21	13	2	125	52	12	204
22	10	1	41	3	1	56
23	5	1	12	15	8	41
24	8	1	100	125	25	259
25	9	5	4	27	9	54
26	14	3	56	6	5	84
27	13	1	40	125	50	229
28	15	6	8	6	8	43
29	17	2	125	52	12	208
30	19	6	80	96	16	217

D-33 файл о33d1A