

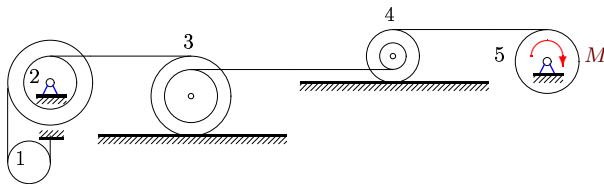
Теорема об изменении кинетической энергии

Механическая система, состоящая из пяти тел 1, 2, 3, 4 и 5, движется под действием внешних сил. Заданы радиусы цилиндров и блоков. Радиусы инерции ρ даны для блоков, цилиндры считать однородными. Горизонтальный стержень, находящийся в зацеплении с блоками, считать невесомым. Массы даны в килограммах, радиусы — в сантиметрах. Найти математическое ожидание скорости груза 1 или центра цилиндра (блока) 1, который опустится по вертикали вниз на случайную величину S с рядом распределения $p = [0.1, 0.4, 0.3, 0.2]$. Приблизительно принять $g = 9.81 \text{ м/с}^2$.

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

Задача L-24.1.

Айсин Т.В.

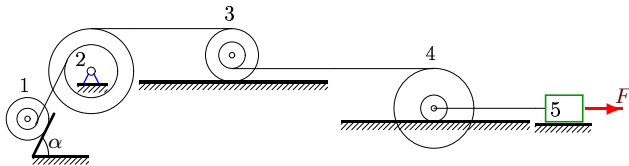


$$\begin{aligned}
 R_2 &= 4, r_2 = 2, \rho_2 = 3, \\
 R_3 &= 3, r_3 = 2, \rho_3 = 2, \\
 R_4 &= 2, r_4 = 1, \rho_4 = 1, \\
 m_1 &= 8, m_2 = 4, \\
 m_3 &= 252, m_4 = 36, \\
 m_5 &= 90.
 \end{aligned}$$

$$S = [2.2, 2.4, 2.7, 2.8] \text{ м.}$$

Задача L-24.2.

Афанасьев В.А.

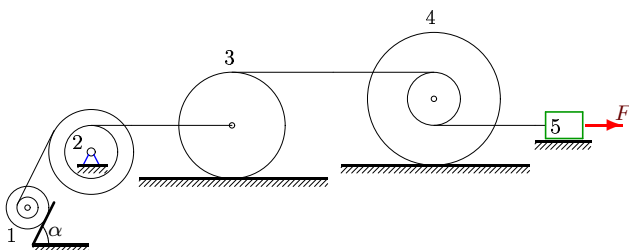


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 2, \\
 R_2 &= 4, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 2, r_3 = 1, \rho_3 = 1, \\
 R_4 &= 3, r_4 = 1, \rho_4 = 2, \\
 m_1 &= 4, m_2 = 32, \\
 m_3 &= 64, m_4 = 256, \\
 m_5 &= 256.
 \end{aligned}$$

$$S = [7.2, 7.5, 7.7, 7.9] \text{ м.}$$

Задача L-24.3.

Бадертдинов Р.Р.

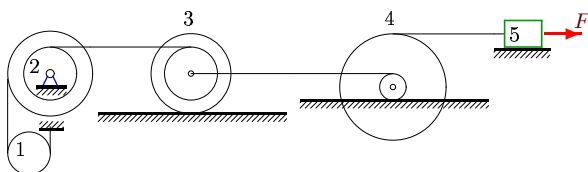


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 1, \\
 R_2 &= 3, r_2 = 2, \rho_2 = 3, \\
 R_3 &= 4, \\
 R_4 &= 5, r_4 = 2, \rho_4 = 4, \\
 m_1 &= 4, m_2 = 12, \\
 m_3 &= 8, m_4 = 49, \\
 m_5 &= 98.
 \end{aligned}$$

$$S = [5.3, 5.4, 5.7, 5.9] \text{ м.}$$

Задача L-24.4.

Бойко О.О.

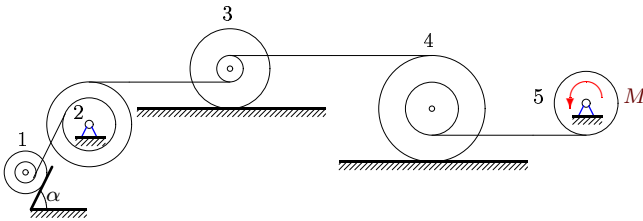


$$\begin{aligned}
 R_2 &= 4, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 3, r_3 = 2, \rho_3 = 2, \\
 R_4 &= 4, r_4 = 1, \rho_4 = 3, \\
 m_1 &= 2, m_2 = 16, \\
 m_3 &= 100, m_4 = 30, \\
 m_5 &= 8.
 \end{aligned}$$

$$S = [6.3, 6.5, 6.7, 6.9] \text{ м.}$$

Задача L-24.5.

Дегтярев Н.Р.

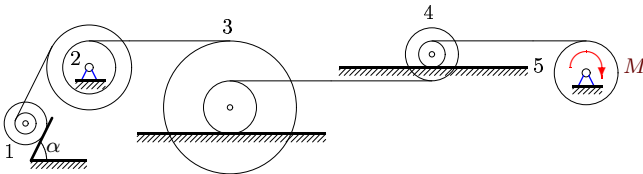


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 1, \\
 R_2 &= 4, r_2 = 2, \rho_2 = 3, \\
 R_3 &= 3, r_3 = 1, \rho_3 = 2, \\
 R_4 &= 4, r_4 = 2, \rho_4 = 3, \\
 m_1 &= 4, m_2 = 80, \\
 m_3 &= 16, m_4 = 48, \\
 m_5 &= 16.
 \end{aligned}$$

$$S = [2.2, 2.4, 2.6, 2.8] \text{ м.}$$

Задача L-24.6.

Евстигнеев Д.Е.

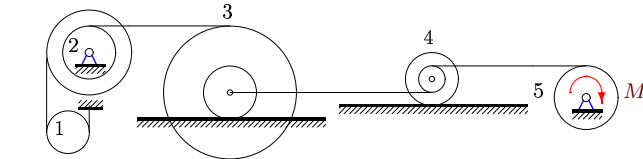


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 1, \\
 R_2 &= 3, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 5, r_3 = 2, \rho_3 = 4, \\
 R_4 &= 2, r_4 = 1, \rho_4 = 1, \\
 m_1 &= 4, m_2 = 24, \\
 m_3 &= 196, m_4 = 147, \\
 m_5 &= 196.
 \end{aligned}$$

$$S = [10.3, 10.4, 10.6, 10.8] \text{ м.}$$

Задача L-24.7.

Жаборовская К.

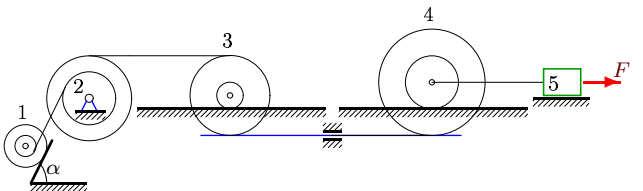


$$\begin{aligned}
 R_2 &= 4, r_2 = 2, \rho_2 = 3, \\
 R_3 &= 5, r_3 = 2, \rho_3 = 4, \\
 R_4 &= 2, r_4 = 1, \rho_4 = 1, \\
 m_1 &= 2, m_2 = 4, \\
 m_3 &= 196, m_4 = 147, \\
 m_5 &= 196.
 \end{aligned}$$

$$S = [5.2, 5.5, 5.6, 5.9] \text{ м.}$$

Задача L-24.8.

Зимичев В.К.

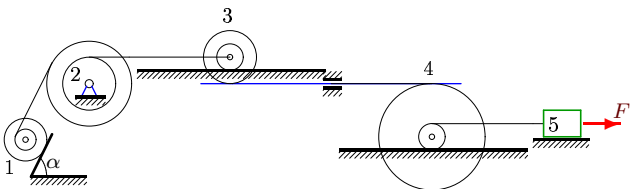


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 1, \\
 R_2 &= 4, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 3, r_3 = 1, \rho_3 = 2, \\
 R_4 &= 4, r_4 = 2, \rho_4 = 3, \\
 m_1 &= 12, m_2 = 32, \\
 m_3 &= 96, m_4 = 80, \\
 m_5 &= 16.
 \end{aligned}$$

$$S = [9.3, 9.5, 9.6, 9.8] \text{ м.}$$

Задача L-24.9.

Китаев С.С.

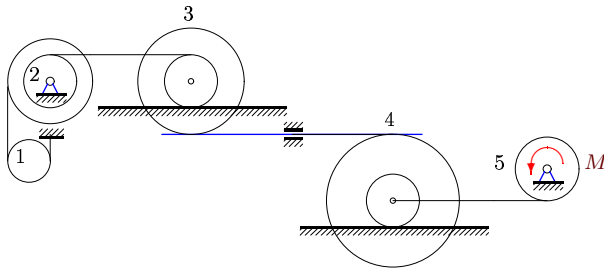


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 2, \\
 R_2 &= 3, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 2, r_3 = 1, \rho_3 = 1, \\
 R_4 &= 4, r_4 = 1, \rho_4 = 3, \\
 m_1 &= 4, m_2 = 12, \\
 m_3 &= 4, m_4 = 15, \\
 m_5 &= 50.
 \end{aligned}$$

$$S = [6.3, 6.4, 6.7, 6.9] \text{ м.}$$

Задача L-24.10.

Ковалёв Р.В.



$$R_2 = 4, r_2 = 2, \rho_2 = 2,$$

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

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

$$m_1 = 4, m_2 = 16,$$

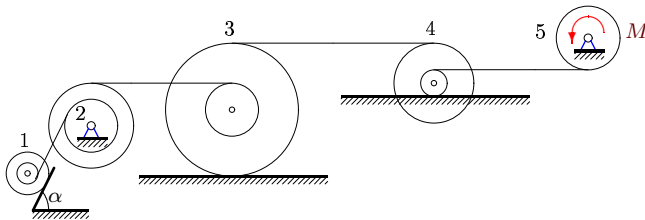
$$m_3 = 80, m_4 = 196,$$

$$m_5 = 294.$$

$$S = [7.2, 7.5, 7.6, 7.8] \text{ м.}$$

Задача L-24.11.

Павлов Д.М.



$$R_1 = 2, r_1 = 1, \rho_1 = 1,$$

$$R_2 = 4, r_2 = 2, \rho_2 = 2,$$

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

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

$$m_1 = 8, m_2 = 80,$$

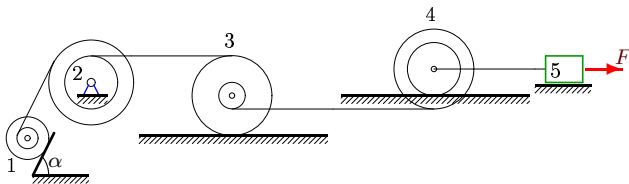
$$m_3 = 245, m_4 = 196,$$

$$m_5 = 294.$$

$$S = [6.2, 6.5, 6.6, 6.8] \text{ м.}$$

Задача L-24.12.

Сайпулаев Г.Р.



$$R_1 = 2, r_1 = 1, \rho_1 = 1,$$

$$R_2 = 3, r_2 = 2, \rho_2 = 2,$$

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

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

$$m_1 = 12, m_2 = 24,$$

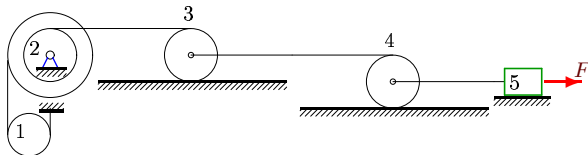
$$m_3 = 216, m_4 = 45,$$

$$m_5 = 36.$$

$$S = [9.3, 9.5, 9.6, 9.8] \text{ м.}$$

Задача L-24.13.

Семенова Г.Д.



$$R_2 = 4, r_2 = 2, \rho_2 = 3,$$

$$R_3 = 2,$$

$$R_4 = 2,$$

$$m_1 = 2, m_2 = 4,$$

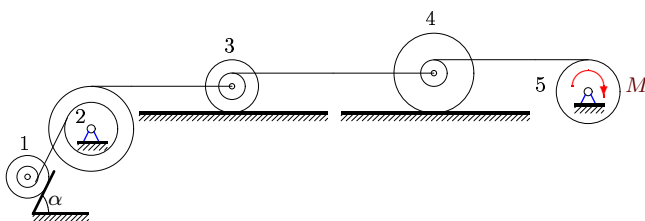
$$m_3 = 32, m_4 = 96,$$

$$m_5 = 32.$$

$$S = [3.2, 3.5, 3.7, 3.8] \text{ м.}$$

Задача L-24.14.

Троцило А.П



$$R_1 = 2, r_1 = 1, \rho_1 = 2,$$

$$R_2 = 4, r_2 = 2, \rho_2 = 3,$$

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

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

$$m_1 = 4, m_2 = 32,$$

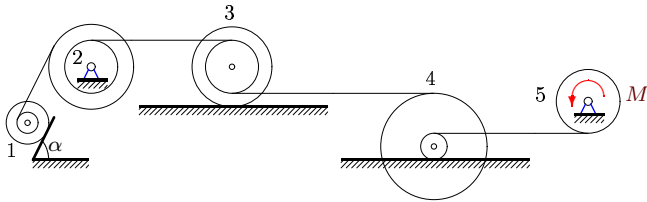
$$m_3 = 16, m_4 = 12,$$

$$m_5 = 4.$$

$$S = [4.2, 4.4, 4.6, 4.9] \text{ м.}$$

Задача L-24.15.

Циммерман А.О

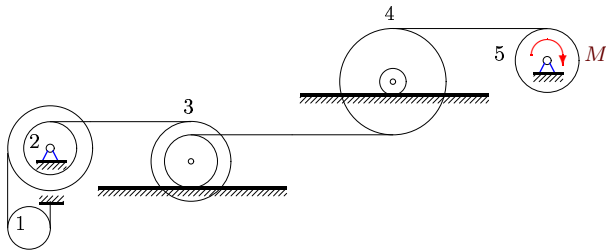


$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 2, \\
 R_2 &= 3, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 3, r_3 = 2, \rho_3 = 2, \\
 R_4 &= 4, r_4 = 1, \rho_4 = 3, \\
 m_1 &= 4, m_2 = 12, \\
 m_3 &= 100, m_4 = 125, \\
 m_5 &= 1250.
 \end{aligned}$$

$$S = [6.2, 6.4, 6.7, 6.9] \text{ м.}$$

Задача L-24.16.

Яцков В.Б.

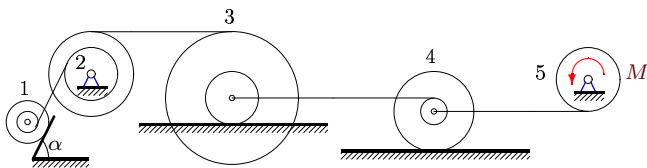


$$\begin{aligned}
 R_2 &= 4, r_2 = 2, \rho_2 = 2, \\
 R_3 &= 3, r_3 = 2, \rho_3 = 2, \\
 R_4 &= 4, r_4 = 1, \rho_4 = 3, \\
 m_1 &= 2, m_2 = 16, \\
 m_3 &= 100, m_4 = 135, \\
 m_5 &= 36.
 \end{aligned}$$

$$S = [8.2, 8.4, 8.7, 8.9] \text{ м.}$$

Задача L-24.17.

Чжу Цзинъюжун



$$\begin{aligned}
 R_1 &= 2, r_1 = 1, \rho_1 = 1, \\
 R_2 &= 4, r_2 = 2, \rho_2 = 3, \\
 R_3 &= 5, r_3 = 2, \rho_3 = 4, \\
 R_4 &= 3, r_4 = 1, \rho_4 = 2, \\
 m_1 &= 4, m_2 = 80, \\
 m_3 &= 196, m_4 = 196, \\
 m_5 &= 392.
 \end{aligned}$$

$$S = [4.3, 4.4, 4.6, 4.9] \text{ м.}$$