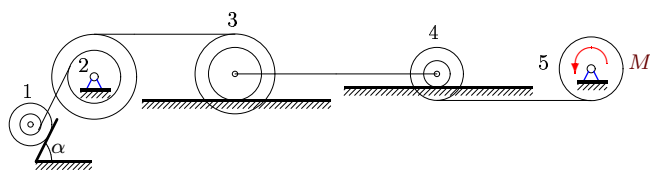


Теорема об изменении кинетической энергии

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 $g = 9.81 \text{ м/с}^2$.

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

Задача L-24.1.

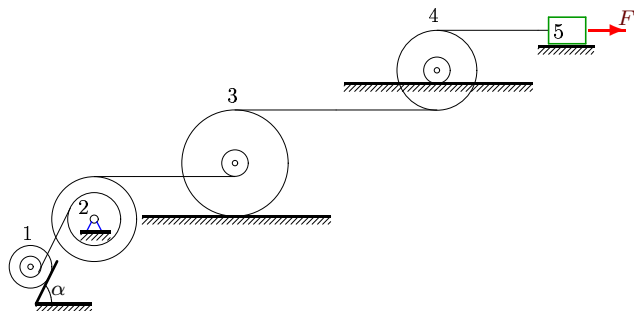


$S = [9.2, 9.4, 9.7, 9.8] \text{ м.}$

Барина Анастасия

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 2, \\ R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 3, r_3 = 2, \rho_3 = 2, \\ R_4 &= 2, r_4 = 1, \rho_4 = 1, \\ m_1 &= 16, m_2 = 96, \\ m_3 &= 175, m_4 = 150, \\ m_5 &= 250. \end{aligned}$$

Задача L-24.2.

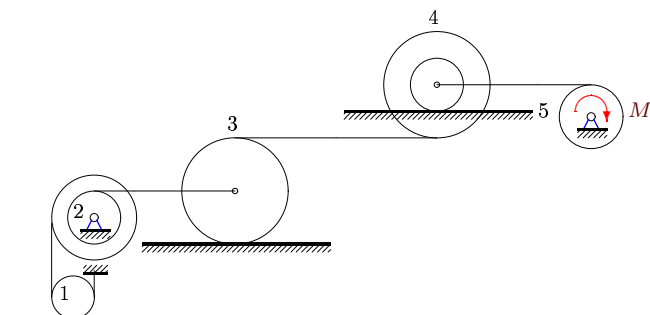


$S = [8.3, 8.4, 8.7, 8.8] \text{ м.}$

Безобразова Анна

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, r_3 = 1, \rho_3 = 3, \\ R_4 &= 3, r_4 = 1, \rho_4 = 2, \\ m_1 &= 20, m_2 = 32, \\ m_3 &= 72, m_4 = 63, \\ m_5 &= 9. \end{aligned}$$

Задача L-24.3.



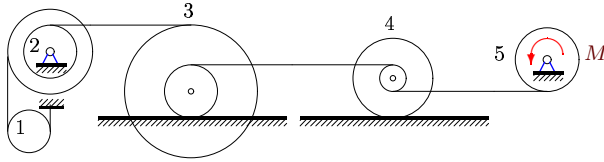
$S = [9.3, 9.4, 9.6, 9.8] \text{ м.}$

Дубов Дмитрий

$$\begin{aligned} R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, \\ R_4 &= 4, r_4 = 2, \rho_4 = 3, \\ m_1 &= 2, m_2 = 20, \\ m_3 &= 8, m_4 = 3, \\ m_5 &= 4. \end{aligned}$$

Задача L-24.4.

Кощеев Артем



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

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

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

$$m_1 = 4, m_2 = 8,$$

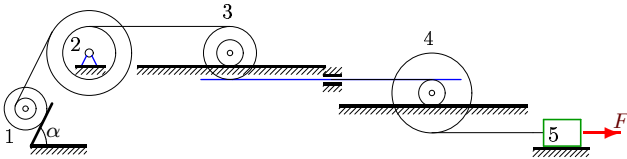
$$m_3 = 245, m_4 = 196,$$

$$m_5 = 294.$$

$$S = [5.2, 5.5, 5.6, 5.8] \text{ м.}$$

Задача L-24.5.

Логвинец Артем



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

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

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

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

$$m_1 = 12, m_2 = 20,$$

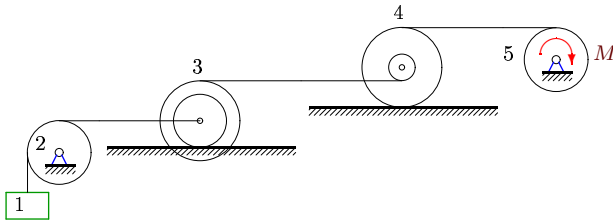
$$m_3 = 54, m_4 = 180,$$

$$m_5 = 36.$$

$$S = [10.3, 10.5, 10.6, 10.8] \text{ м.}$$

Задача L-24.6.

Малянов Иван



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

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

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

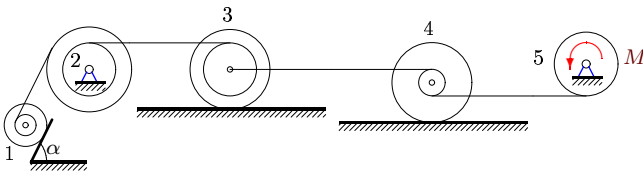
$$m_3 = 4, m_4 = 16,$$

$$m_5 = 8.$$

$$S = [2.3, 2.4, 2.6, 2.8] \text{ м.}$$

Задача L-24.7.

Рябцев Андрей



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

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

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

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

$$m_1 = 4, m_2 = 20,$$

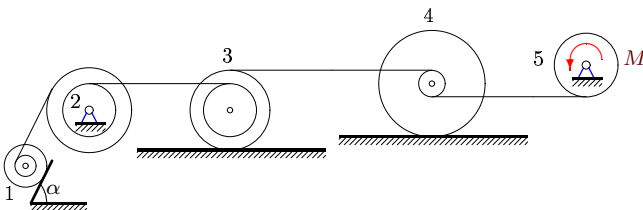
$$m_3 = 100, m_4 = 400,$$

$$m_5 = 200.$$

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

Задача L-24.8.

Сайпулаев Муса



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

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

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

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

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

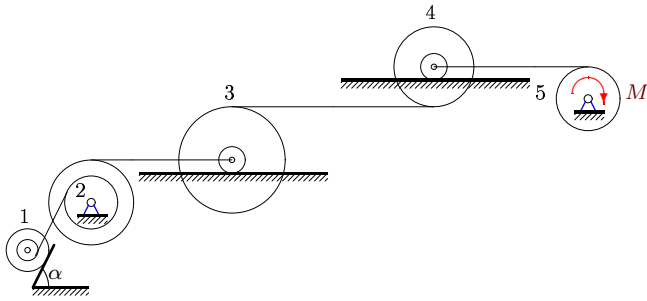
$$m_3 = 100, m_4 = 75,$$

$$m_5 = 1250.$$

$$S = [5.3, 5.4, 5.6, 5.9] \text{ м.}$$

Задача L-24.9.

Смирнов Павел



$S = [9.2, 9.4, 9.6, 9.9] \text{ м.}$

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

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

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

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

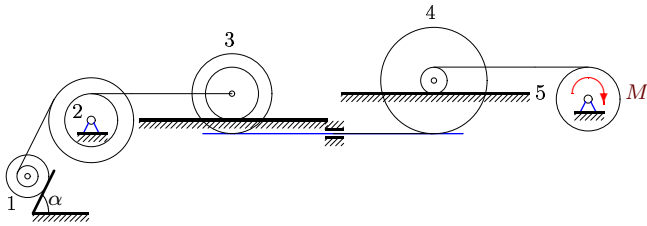
$$m_1 = 4, m_2 = 32,$$

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

$$m_5 = 16.$$

Задача L-24.10.

Цыганов Дмитрий



$S = [10.2, 10.5, 10.6, 10.8] \text{ м.}$

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

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

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

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

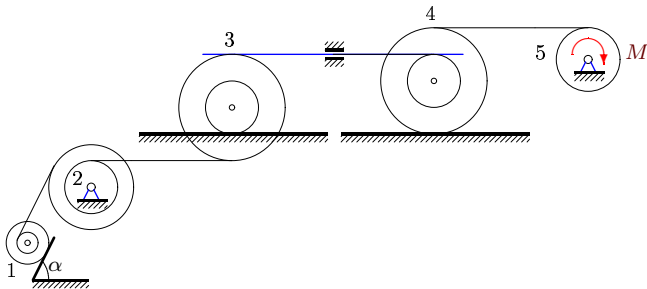
$$m_1 = 8, m_2 = 12,$$

$$m_3 = 5, m_4 = 72,$$

$$m_5 = 54.$$

Задача L-24.11.

Васин Павел



$S = [1.3, 1.4, 1.6, 1.9] \text{ м.}$

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

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

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

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

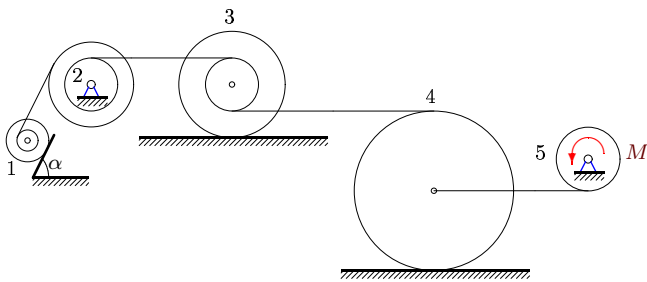
$$m_1 = 4, m_2 = 8,$$

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

$$m_5 = 4.$$

Задача L-24.12.

Похвалитова Анна



$S = [3.2, 3.5, 3.6, 3.9] \text{ м.}$

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

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

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

$$R_4 = 6,$$

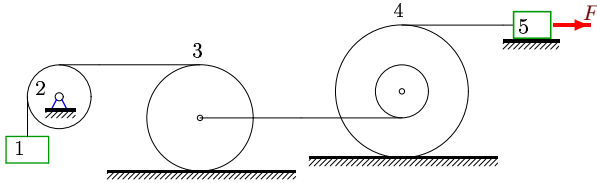
$$m_1 = 4, m_2 = 12,$$

$$m_3 = 144, m_4 = 72,$$

$$m_5 = 144.$$

Задача L-24.13.

Сенчихина Дарья



$$R_3 = 4,$$

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

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

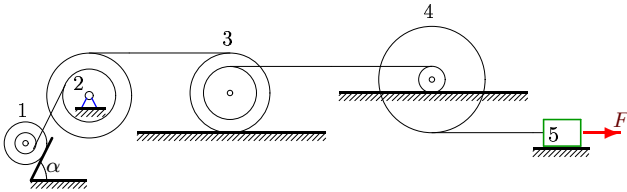
$$m_3 = 32, m_4 = 108,$$

$$m_5 = 18.$$

$$S = [2.3, 2.5, 2.6, 2.9] \text{ м.}$$

Задача L-24.14.

Фам Тхай Ву



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

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

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

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

$$m_1 = 4, m_2 = 64,$$

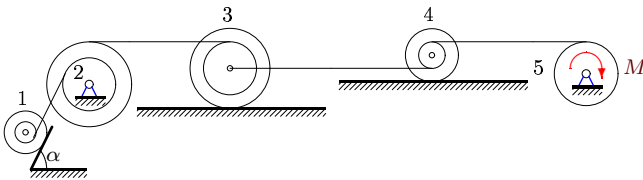
$$m_3 = 144, m_4 = 72,$$

$$m_5 = 32.$$

$$S = [10.3, 10.5, 10.7, 10.8] \text{ м.}$$

Задача L-24.15.

Ромеро Моника



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

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

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

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

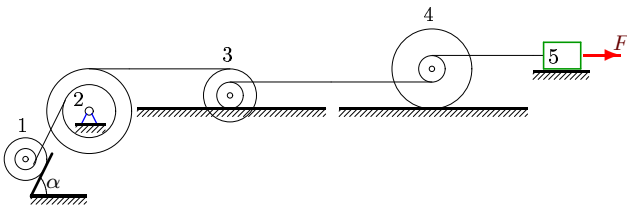
$$m_1 = 8, m_2 = 96,$$

$$m_3 = 125, m_4 = 20,$$

$$m_5 = 150.$$

$$S = [5.2, 5.5, 5.6, 5.8] \text{ м.}$$

Задача L-24.16.



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

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

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

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

$$m_1 = 12, m_2 = 80,$$

$$m_3 = 54, m_4 = 45,$$

$$m_5 = 36.$$

$$S = [5.3, 5.5, 5.6, 5.8] \text{ м.}$$