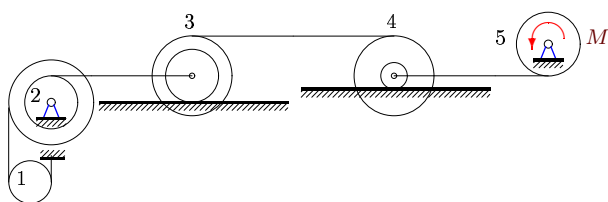


Теорема об изменении кинетической энергии

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 24.1.

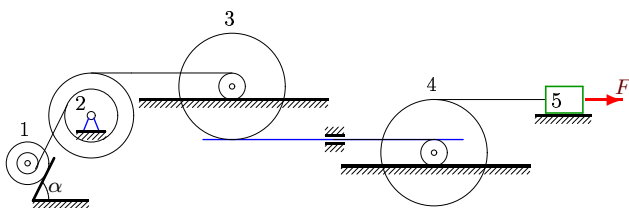


$$S = [7.2, 7.4, 7.7, 7.8] \text{ м.}$$

Алешин Владислав Александрович

$$\begin{aligned} R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 3, r_3 = 2, \rho_3 = 2, \\ R_4 &= 3, r_4 = 1, \rho_4 = 2, \\ m_1 &= 8, m_2 = 20, \\ m_3 &= 7, m_4 = 64, \\ m_5 &= 128. \end{aligned}$$

Задача 24.2.

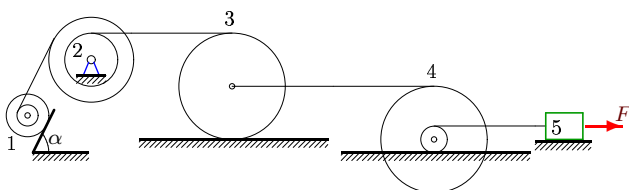


$$S = [6.3, 6.4, 6.7, 6.8] \text{ м.}$$

Андреев Данил Романович

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, r_3 = 1, \rho_3 = 3, \\ R_4 &= 4, r_4 = 1, \rho_4 = 3, \\ m_1 &= 20, m_2 = 64, \\ m_3 &= 16, m_4 = 56, \\ m_5 &= 16. \end{aligned}$$

Задача 24.3.

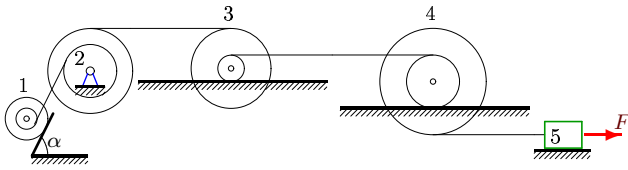


$$S = [6.3, 6.5, 6.6, 6.9] \text{ м.}$$

Власов Владимир Михайлович

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 3, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, \\ R_4 &= 4, r_4 = 1, \rho_4 = 3, \\ m_1 &= 4, m_2 = 12, \\ m_3 &= 32, m_4 = 30, \\ m_5 &= 50. \end{aligned}$$

Задача 24.4.

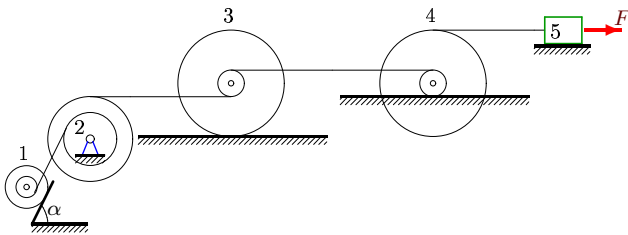


$S = [10.3, 10.4, 10.7, 10.9]$ м.

Глазков Никита Владимирович

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 4, r_4 = 2, \rho_4 = 3, \\ m_1 &= 4, m_2 = 32, \\ m_3 &= 64, m_4 = 192, \\ m_5 &= 32. \end{aligned}$$

Задача 24.5.

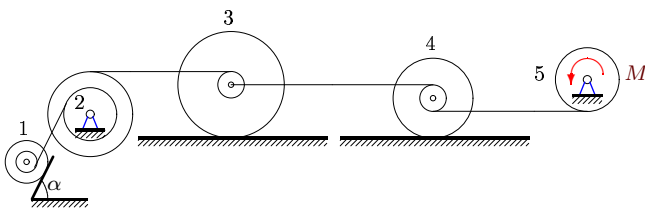


$S = [6.3, 6.5, 6.6, 6.8]$ м.

Гриневич Илья Константинович

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, r_3 = 1, \rho_3 = 3, \\ R_4 &= 4, r_4 = 1, \rho_4 = 3, \\ m_1 &= 12, m_2 = 64, \\ m_3 &= 54, m_4 = 18, \\ m_5 &= 36. \end{aligned}$$

Задача 24.6.

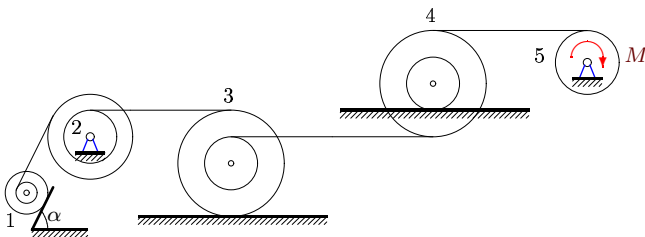


$S = [5.2, 5.4, 5.6, 5.8]$ м.

Ершов Никита Сергеевич

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 3, \\ R_3 &= 4, r_3 = 1, \rho_3 = 3, \\ R_4 &= 3, r_4 = 1, \rho_4 = 2, \\ m_1 &= 4, m_2 = 32, \\ m_3 &= 4, m_4 = 75, \\ m_5 &= 100. \end{aligned}$$

Задача 24.7.

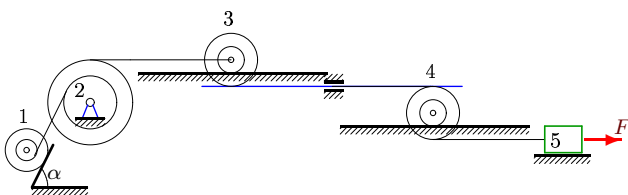


$S = [8.2, 8.5, 8.6, 8.8]$ м.

Зыза Анастасия Олеговна

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 3, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, r_3 = 2, \rho_3 = 3, \\ R_4 &= 4, r_4 = 2, \rho_4 = 3, \\ m_1 &= 8, m_2 = 8, \\ m_3 &= 320, m_4 = 256, \\ m_5 &= 96. \end{aligned}$$

Задача 24.8.

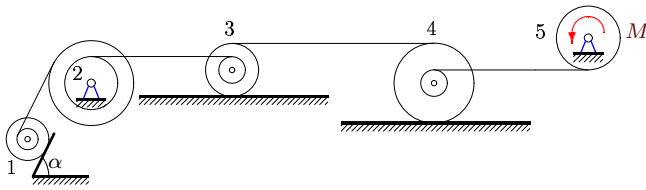


$S = [8.3, 8.5, 8.6, 8.9]$ м.

Ирха Кирилл Вадимович

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 2, \\ R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 2, r_3 = 1, \rho_3 = 1, \\ R_4 &= 2, r_4 = 1, \rho_4 = 1, \\ m_1 &= 4, m_2 = 16, \\ m_3 &= 4, m_4 = 27, \\ m_5 &= 18. \end{aligned}$$

Задача 24.9.

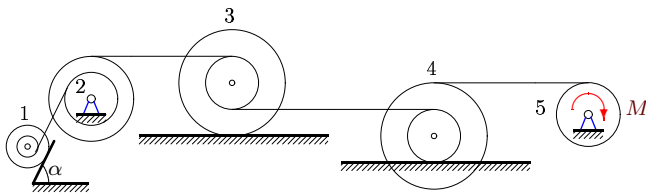


$S = [1.2, 1.4, 1.6, 1.9]$ м.

Кундиус Егор Евгеньевич

$R_1 = 2, r_1 = 1, \rho_1 = 2,$
 $R_2 = 3, r_2 = 2, \rho_2 = 3,$
 $R_3 = 2, r_3 = 1, \rho_3 = 1,$
 $R_4 = 3, r_4 = 1, \rho_4 = 2,$
 $m_1 = 4, m_2 = 20,$
 $m_3 = 36, m_4 = 243,$
 $m_5 = 162.$

Задача 24.10.

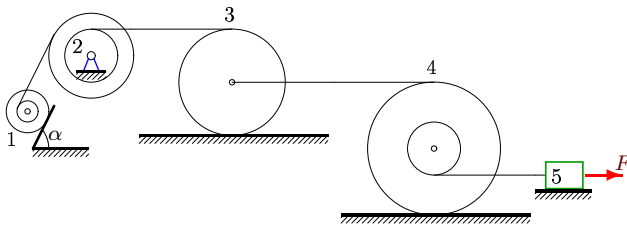


$S = [6.2, 6.4, 6.7, 6.9]$ м.

Луценко Петр Викторович

$R_1 = 2, r_1 = 1, \rho_1 = 1,$
 $R_2 = 4, r_2 = 2, \rho_2 = 2,$
 $R_3 = 4, r_3 = 2, \rho_3 = 3,$
 $R_4 = 4, r_4 = 2, \rho_4 = 3,$
 $m_1 = 4, m_2 = 32,$
 $m_3 = 144, m_4 = 144,$
 $m_5 = 16.$

Задача 24.11.

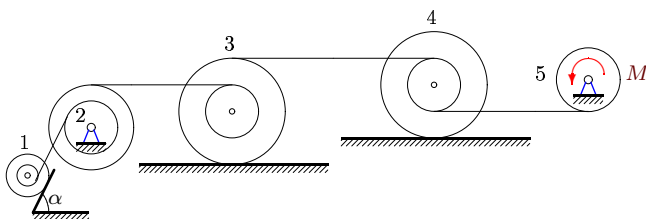


$S = [2.2, 2.5, 2.7, 2.8]$ м.

Мазур Илья Викторович

$R_1 = 2, r_1 = 1, \rho_1 = 1,$
 $R_2 = 3, r_2 = 2, \rho_2 = 3,$
 $R_3 = 4,$
 $R_4 = 5, r_4 = 2, \rho_4 = 4,$
 $m_1 = 4, m_2 = 12,$
 $m_3 = 32, m_4 = 400,$
 $m_5 = 400.$

Задача 24.12.

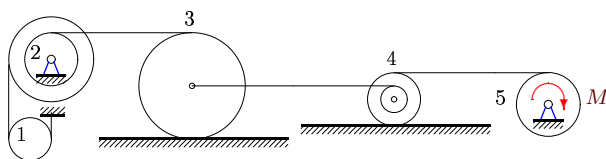


$S = [5.2, 5.5, 5.6, 5.8]$ м.

Нечаева Полина Игоревна

$R_1 = 2, r_1 = 1, \rho_1 = 1,$
 $R_2 = 4, r_2 = 2, \rho_2 = 3,$
 $R_3 = 4, r_3 = 2, \rho_3 = 3,$
 $R_4 = 4, r_4 = 2, \rho_4 = 3,$
 $m_1 = 8, m_2 = 32,$
 $m_3 = 180, m_4 = 324,$
 $m_5 = 162.$

Задача 24.13.



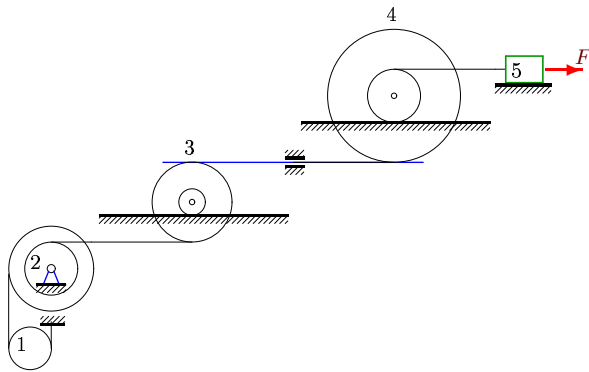
$S = [1.2, 1.4, 1.7, 1.8]$ м.

Обухов Семен Денисович

$R_2 = 4, r_2 = 2, \rho_2 = 3,$
 $R_3 = 4,$
 $R_4 = 2, r_4 = 1, \rho_4 = 1,$
 $m_1 = 8, m_2 = 24,$
 $m_3 = 56, m_4 = 216,$
 $m_5 = 90.$

Задача 24.14.

Плеханов Артем Дмитриевич

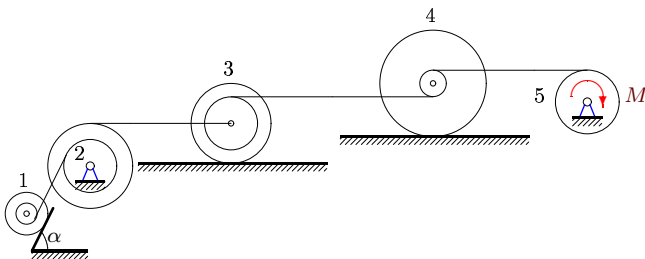


$S = [10.3, 10.4, 10.7, 10.9]$ м.

$$\begin{aligned} R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 5, r_4 = 2, \rho_4 = 4, \\ m_1 &= 2, m_2 = 12, \\ m_3 &= 16, m_4 = 27, \\ m_5 &= 18. \end{aligned}$$

Задача 24.15.

Селиванов Александр Михайлович

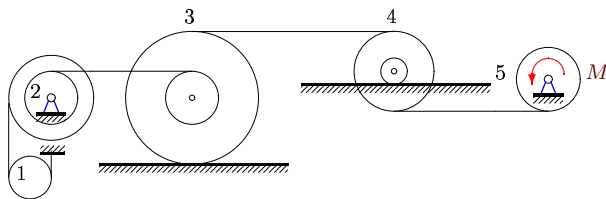


$S = [5.3, 5.4, 5.6, 5.8]$ м.

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 2, \\ R_2 &= 4, r_2 = 2, \rho_2 = 3, \\ R_3 &= 3, r_3 = 2, \rho_3 = 2, \\ R_4 &= 4, r_4 = 1, \rho_4 = 3, \\ m_1 &= 4, m_2 = 48, \\ m_3 &= 36, m_4 = 81, \\ m_5 &= 162. \end{aligned}$$

Задача 24.16.

Ступак Александра Алексеевна

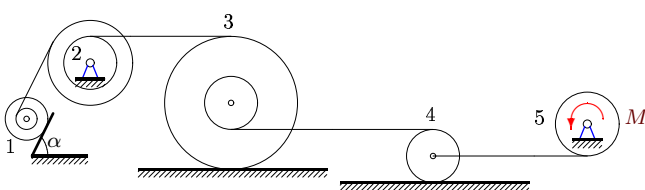


$S = [8.2, 8.4, 8.7, 8.8]$ м.

$$\begin{aligned} R_2 &= 4, r_2 = 2, \rho_2 = 2, \\ R_3 &= 5, r_3 = 2, \rho_3 = 4, \\ R_4 &= 3, r_4 = 1, \rho_4 = 2, \\ m_1 &= 8, m_2 = 20, \\ m_3 &= 343, m_4 = 196, \\ m_5 &= 490. \end{aligned}$$

Задача 24.17.

Сухов Александр Александрович

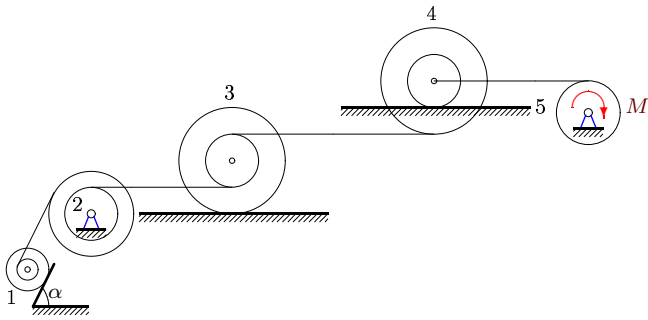


$S = [3.3, 3.4, 3.6, 3.9]$ м.

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 3, r_2 = 2, \rho_2 = 3, \\ R_3 &= 5, r_3 = 2, \rho_3 = 4, \\ R_4 &= 2, \\ m_1 &= 4, m_2 = 4, \\ m_3 &= 100, m_4 = 800, \\ m_5 &= 800. \end{aligned}$$

Задача 24.18.

Терехова Маргарита Александровна

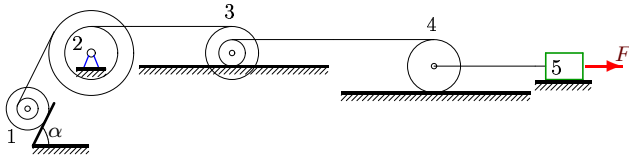


$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 3, r_2 = 2, \rho_2 = 2, \\ R_3 &= 4, r_3 = 2, \rho_3 = 3, \\ R_4 &= 4, r_4 = 2, \rho_4 = 3, \\ m_1 &= 8, m_2 = 8, \\ m_3 &= 20, m_4 = 16, \\ m_5 &= 6. \end{aligned}$$

$$S = [9.2, 9.5, 9.6, 9.8] \text{ м.}$$

Задача 24.19.

Фернанду Марселину Жулиу

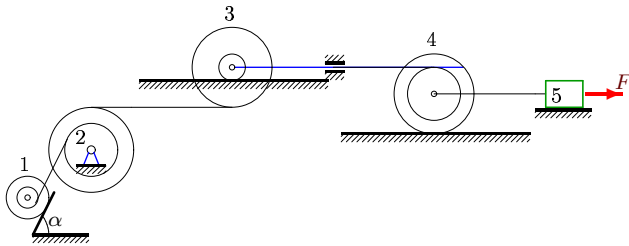


$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 2, \\ R_2 &= 3, r_2 = 2, \rho_2 = 3, \\ R_3 &= 2, r_3 = 1, \rho_3 = 1, \\ R_4 &= 2, \\ m_1 &= 20, m_2 = 4, \\ m_3 &= 72, m_4 = 42, \\ m_5 &= 54. \end{aligned}$$

$$S = [3.3, 3.4, 3.7, 3.8] \text{ м.}$$

Задача 24.20.

Хименес Мендиета Хулио Сэсар

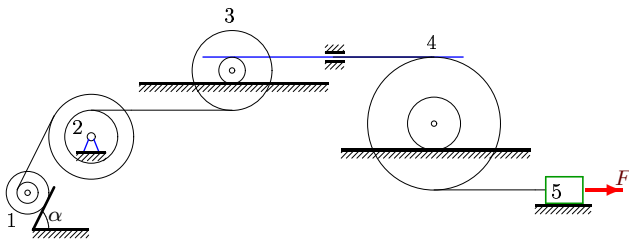


$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 3, \\ R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 3, r_4 = 2, \rho_4 = 2, \\ m_1 &= 4, m_2 = 96, \\ m_3 &= 16, m_4 = 100, \\ m_5 &= 100. \end{aligned}$$

$$S = [4.3, 4.5, 4.6, 4.9] \text{ м.}$$

Задача 24.21.

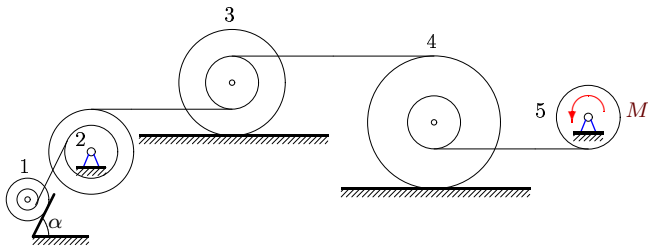
Шаповалов Андрей Евгеньевич



$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 3, r_2 = 2, \rho_2 = 2, \\ R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 5, r_4 = 2, \rho_4 = 4, \\ m_1 &= 4, m_2 = 16, \\ m_3 &= 16, m_4 = 147, \\ m_5 &= 98. \end{aligned}$$

$$S = [8.2, 8.5, 8.7, 8.9] \text{ м.}$$

Задача 24.22.

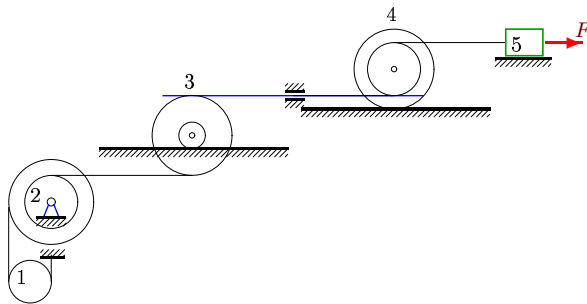


$S = [2.3, 2.4, 2.6, 2.8]$ м.

Шаповалова Мария Евгеньевна

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 3, \\ R_3 &= 4, r_3 = 2, \rho_3 = 3, \\ R_4 &= 5, r_4 = 2, \rho_4 = 4, \\ m_1 &= 4, m_2 = 64, \\ m_3 &= 16, m_4 = 100, \\ m_5 &= 200. \end{aligned}$$

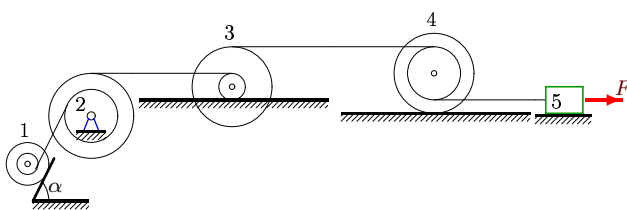
Задача 24.23.



$S = [5.3, 5.5, 5.6, 5.9]$ м.

$$\begin{aligned} R_2 &= 4, r_2 = 2, \rho_2 = 3, \\ R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 3, r_4 = 2, \rho_4 = 2, \\ m_1 &= 2, m_2 = 24, \\ m_3 &= 16, m_4 = 3, \\ m_5 &= 2. \end{aligned}$$

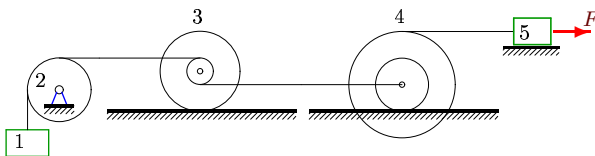
Задача 24.24.



$S = [5.3, 5.5, 5.6, 5.9]$ м.

$$\begin{aligned} R_1 &= 2, r_1 = 1, \rho_1 = 1, \\ R_2 &= 4, r_2 = 2, \rho_2 = 3, \\ R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 3, r_4 = 2, \rho_4 = 2, \\ m_1 &= 4, m_2 = 96, \\ m_3 &= 16, m_4 = 75, \\ m_5 &= 50. \end{aligned}$$

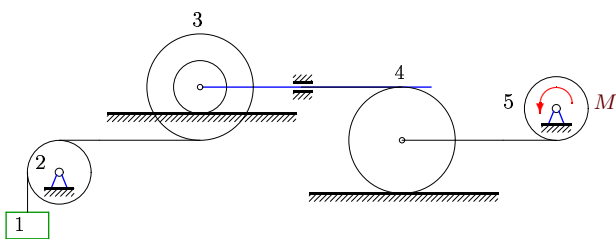
Задача 24.25.



$S = [7.2, 7.5, 7.7, 7.9]$ м.

$$\begin{aligned} R_3 &= 3, r_3 = 1, \rho_3 = 2, \\ R_4 &= 4, r_4 = 2, \rho_4 = 3, \\ m_1 &= 13, m_2 = 10, \\ m_3 &= 64, m_4 = 48, \\ m_5 &= 8. \end{aligned}$$

Задача 24.26.



$S = [3.2, 3.4, 3.7, 3.8]$ м.

$$\begin{aligned} R_3 &= 4, r_3 = 2, \rho_3 = 3, \\ R_4 &= 4, \\ m_1 &= 16, m_2 = 12, \\ m_3 &= 28, m_4 = 48, \\ m_5 &= 40. \end{aligned}$$