

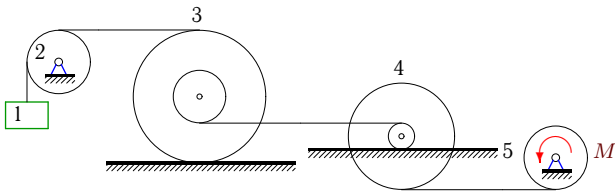
## Кинетическая энергия системы. Приведенные массы

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.

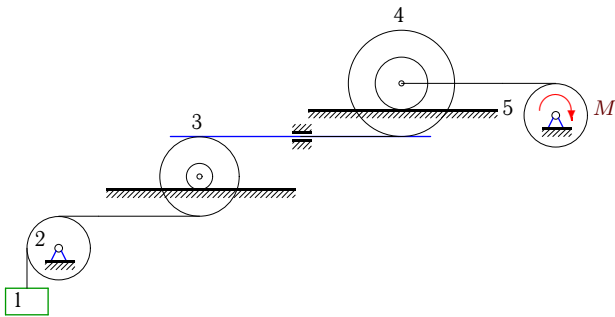
Акулина Даша



$$\begin{aligned} R_3 &= 5, \quad r_3 = 2, \quad \rho_3 = 4, \\ R_4 &= 4, \quad r_4 = 1, \quad \rho_4 = 3, \\ m_1 &= 13, \quad m_2 = 6, \\ m_3 &= 100, \quad m_4 = 120, \\ m_5 &= 800. \end{aligned}$$

### Задача D-33.2.

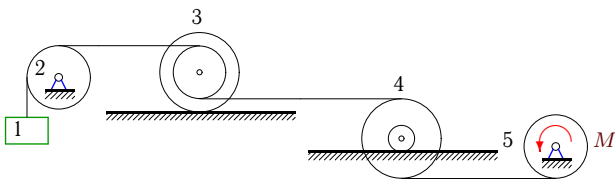
Анарбаев Б.



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

### Задача D-33.3.

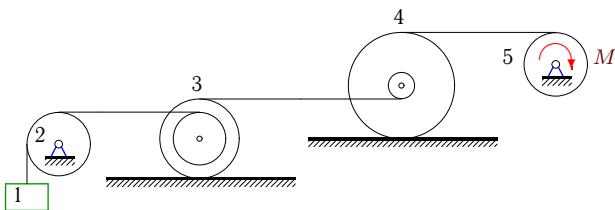
Баранов Максим



$$\begin{aligned} R_3 &= 3, \quad r_3 = 2, \quad \rho_3 = 2, \\ R_4 &= 3, \quad r_4 = 1, \quad \rho_4 = 2, \\ m_1 &= 14, \quad m_2 = 4, \\ m_3 &= 100, \quad m_4 = 240, \\ m_5 &= 200. \end{aligned}$$

### Задача D-33.4.

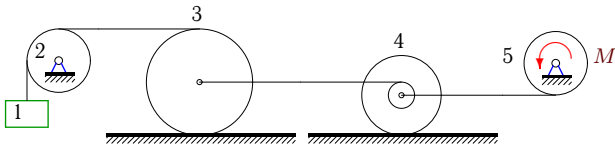
Бебрили Эмиль



$$\begin{aligned} R_3 &= 3, \quad r_3 = 2, \quad \rho_3 = 2, \\ R_4 &= 4, \quad r_4 = 1, \quad \rho_4 = 3, \\ m_1 &= 5, \quad m_2 = 6, \\ m_3 &= 125, \quad m_4 = 4, \\ m_5 &= 50. \end{aligned}$$

**Задача D-33.5.**

*Биль Евгений*



$$R_3 = 4,$$

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

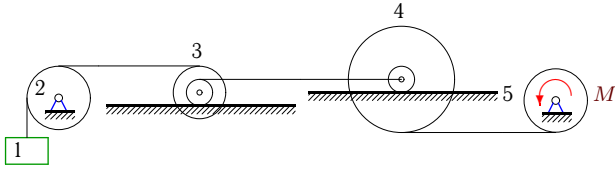
$$m_1 = 9, m_2 = 10,$$

$$m_3 = 40, m_4 = 256,$$

$$m_5 = 128.$$

**Задача D-33.6.**

*Волковой Илья*



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

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

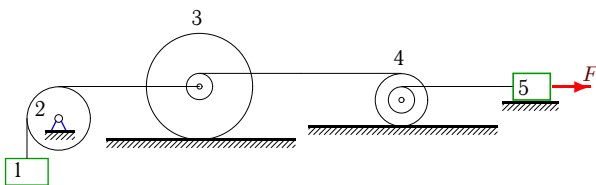
$$m_1 = 16, m_2 = 8,$$

$$m_3 = 36, m_4 = 27,$$

$$m_5 = 4.$$

**Задача D-33.7.**

*Глядяев А.Д.*



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

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

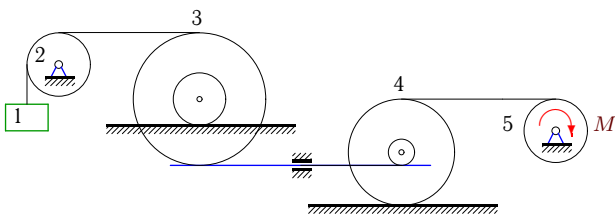
$$m_1 = 6, m_2 = 2,$$

$$m_3 = 64, m_4 = 256,$$

$$m_5 = 256.$$

**Задача D-33.8.**

*Горбатенко Егор*



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

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

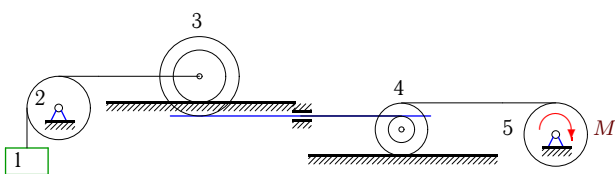
$$m_1 = 11, m_2 = 6,$$

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

$$m_5 = 196.$$

**Задача D-33.9.**

*Губин Иван*



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

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

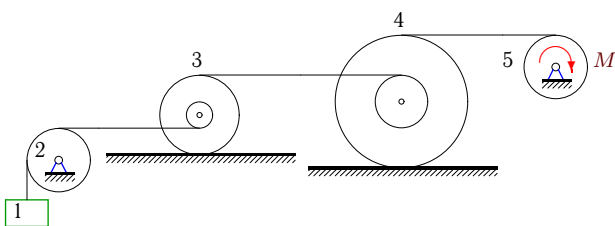
$$m_1 = 11, m_2 = 2,$$

$$m_3 = 4, m_4 = 108,$$

$$m_5 = 36.$$

**Задача D-33.10.**

*Драгин Егор*



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

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

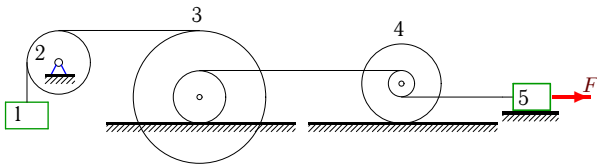
$$m_1 = 4, m_2 = 8,$$

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

$$m_5 = 98.$$

**Задача D-33.11.**

*Исаков Александр*



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

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

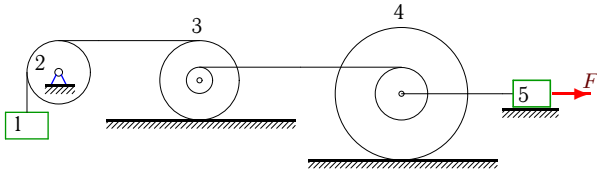
$$m_1 = 12, m_2 = 10,$$

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

$$m_5 = 98.$$

**Задача D-33.12.**

*Картушин Александр*



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

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

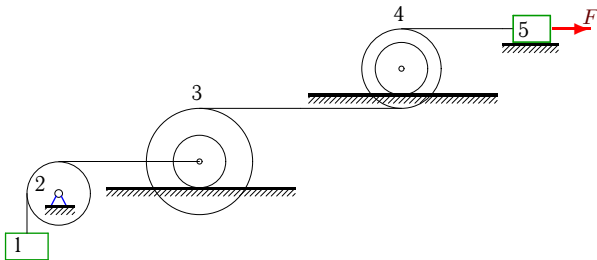
$$m_1 = 10, m_2 = 8,$$

$$m_3 = 288, m_4 = 441,$$

$$m_5 = 441.$$

**Задача D-33.13.**

*Костина Даша*



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

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

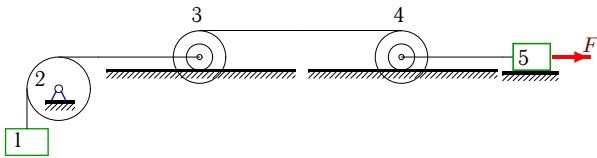
$$m_1 = 16, m_2 = 12,$$

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

$$m_5 = 1.$$

**Задача D-33.14.**

*Лбова Александра*



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

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

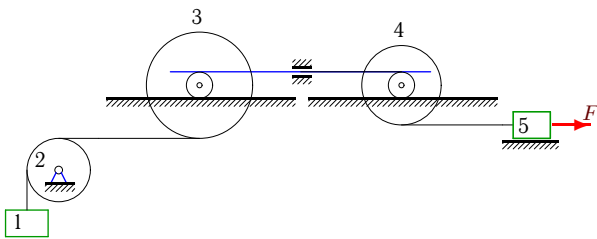
$$m_1 = 19, m_2 = 12,$$

$$m_3 = 8, m_4 = 7,$$

$$m_5 = 6.$$

**Задача D-33.15.**

*Муржи Николай*



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

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

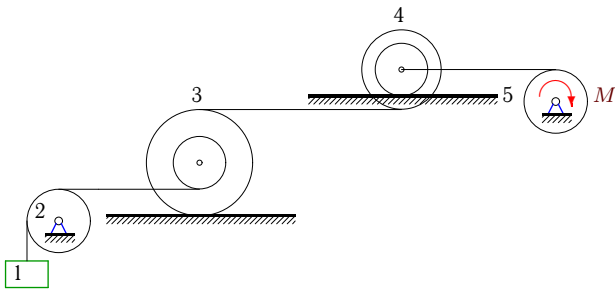
$$m_1 = 21, m_2 = 10,$$

$$m_3 = 36, m_4 = 27,$$

$$m_5 = 18.$$

**Задача D-33.16.**

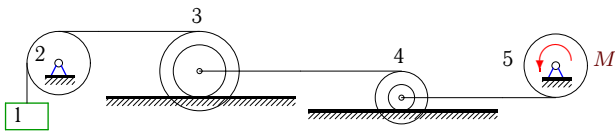
*Никитенков Федор*



$$\begin{aligned}
 R_3 &= 4, r_3 = 2, \rho_3 = 3, \\
 R_4 &= 3, r_4 = 2, \rho_4 = 2, \\
 m_1 &= 15, m_2 = 2, \\
 m_3 &= 28, m_4 = 1, \\
 m_5 &= 10.
 \end{aligned}$$

**Задача D-33.17.**

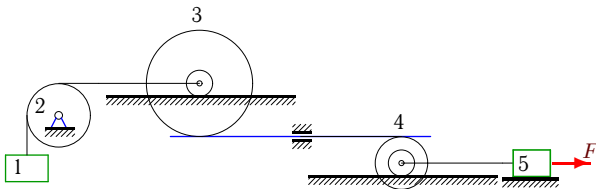
*Новиков Павел*



$$\begin{aligned}
 R_3 &= 3, r_3 = 2, \rho_3 = 2, \\
 R_4 &= 2, r_4 = 1, \rho_4 = 1, \\
 m_1 &= 18, m_2 = 2, \\
 m_3 &= 175, m_4 = 225, \\
 m_5 &= 450.
 \end{aligned}$$

**Задача D-33.18.**

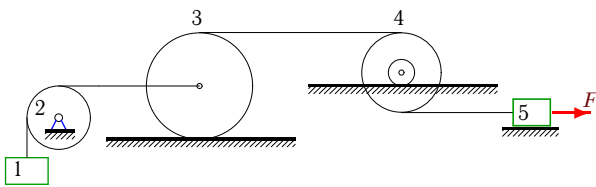
*Опитев Владислав*



$$\begin{aligned}
 R_3 &= 4, r_3 = 1, \rho_3 = 3, \\
 R_4 &= 2, r_4 = 1, \rho_4 = 1, \\
 m_1 &= 17, m_2 = 2, \\
 m_3 &= 4, m_4 = 3, \\
 m_5 &= 2.
 \end{aligned}$$

**Задача D-33.19.**

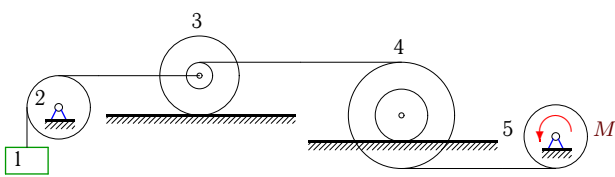
*Оршак Сергей*



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

**Задача D-33.20.**

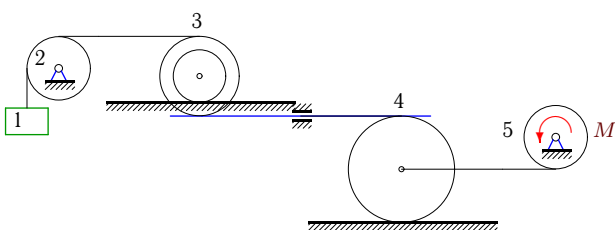
*Парахин Андрей*



$$\begin{aligned}
 R_3 &= 3, r_3 = 1, \rho_3 = 2, \\
 R_4 &= 4, r_4 = 2, \rho_4 = 3, \\
 m_1 &= 13, m_2 = 10, \\
 m_3 &= 36, m_4 = 243, \\
 m_5 &= 162.
 \end{aligned}$$

**Задача D-33.21.**

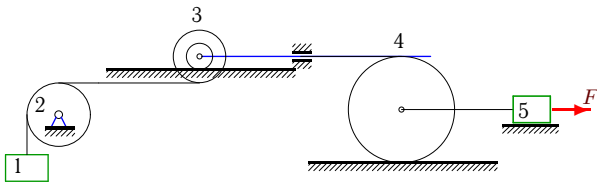
*Парохин Антон*



$$\begin{aligned}
 R_3 &= 3, r_3 = 2, \rho_3 = 2, \\
 R_4 &= 4, \\
 m_1 &= 12, m_2 = 6, \\
 m_3 &= 100, m_4 = 200, \\
 m_5 &= 200.
 \end{aligned}$$

**Задача D-33.22.**

*Пархоменко Иван*



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

$$R_4 = 4,$$

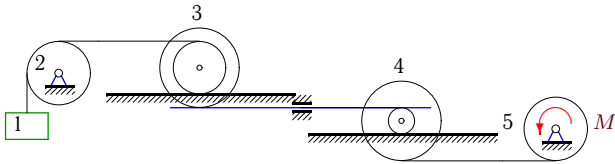
$$m_1 = 13, m_2 = 10,$$

$$m_3 = 4, m_4 = 24,$$

$$m_5 = 8.$$

**Задача D-33.23.**

*Петров Кирилл*



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

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

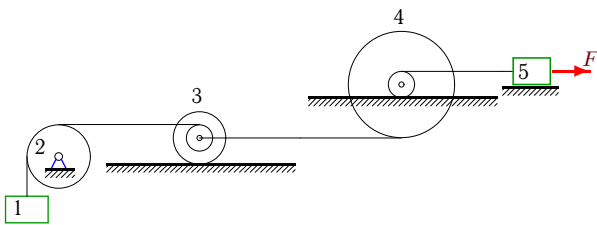
$$m_1 = 21, m_2 = 10,$$

$$m_3 = 8, m_4 = 192,$$

$$m_5 = 64.$$

**Задача D-33.24.**

*Петухов Антон*



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

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

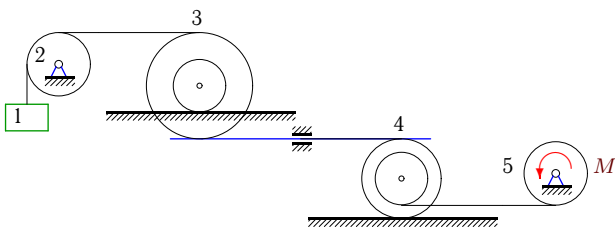
$$m_1 = 15, m_2 = 8,$$

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

$$m_5 = 162.$$

**Задача D-33.25.**

*Руфин Никита*



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

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

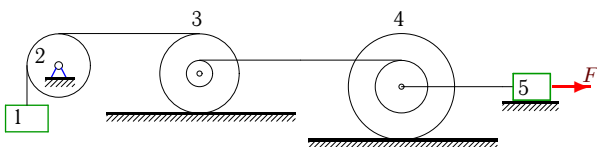
$$m_1 = 11, m_2 = 12,$$

$$m_3 = 144, m_4 = 324,$$

$$m_5 = 648.$$

**Задача D-33.26.**

*Самойлов Никита*



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

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

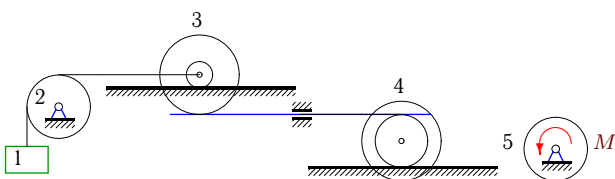
$$m_1 = 6, m_2 = 10,$$

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

$$m_5 = 162.$$

**Задача D-33.27.**

*Семенова Ирина*



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

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

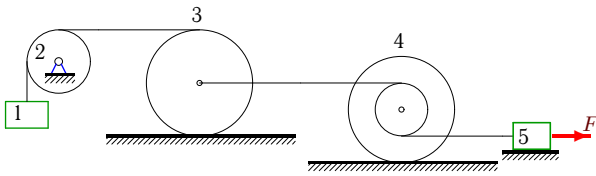
$$m_1 = 20, m_2 = 2,$$

$$m_3 = 4, m_4 = 3,$$

$$m_5 = 16.$$

**Задача D-33.28.**

*Слявин Ярослав*



$$R_3 = 4,$$

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

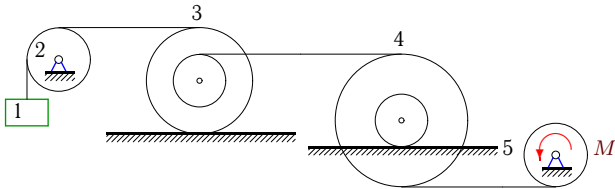
$$m_1 = 9, m_2 = 10,$$

$$m_3 = 32, m_4 = 144,$$

$$m_5 = 72.$$

**Задача D-33.29.**

*Сюлюкин Кирилл*



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

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

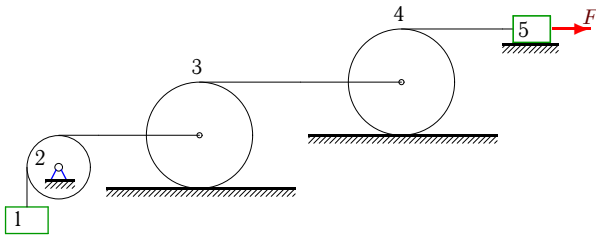
$$m_1 = 13, m_2 = 8,$$

$$m_3 = 448, m_4 = 196,$$

$$m_5 = 1568.$$

**Задача D-33.30.**

*Хачалов Магомед*



$$R_3 = 4,$$

$$R_4 = 4,$$

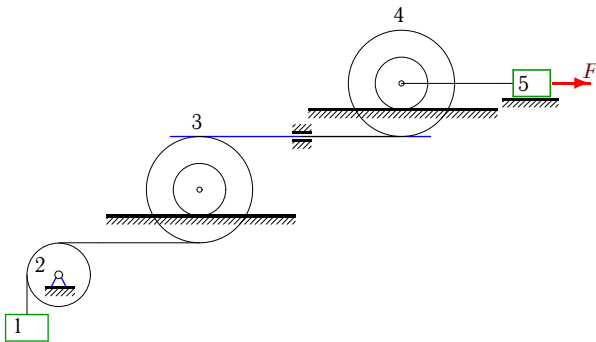
$$m_1 = 9, m_2 = 4,$$

$$m_3 = 12, m_4 = 5,$$

$$m_5 = 4.$$

**Задача D-33.31.**

*Чаймелов Андрей*



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

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

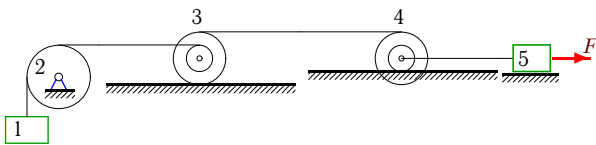
$$m_1 = 18, m_2 = 4,$$

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

$$m_5 = 2.$$

**Задача D-33.32.**

*Чумаков Иван*



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

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

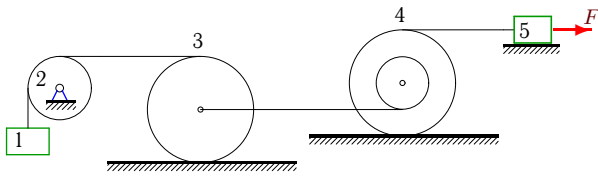
$$m_1 = 9, m_2 = 2,$$

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

$$m_5 = 162.$$

**Задача D-33.33.**

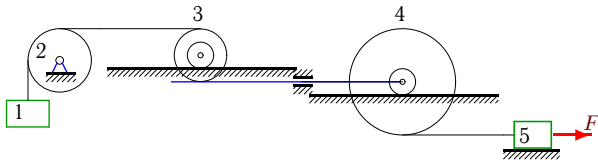
*Шубин Станислав*



$$\begin{aligned}
 R_3 &= 4, \\
 R_4 &= 4, r_4 = 2, \rho_4 = 3, \\
 m_1 &= 6, m_2 = 4, \\
 m_3 &= 32, m_4 = 48, \\
 m_5 &= 2.
 \end{aligned}$$

**Задача D-33.34.**

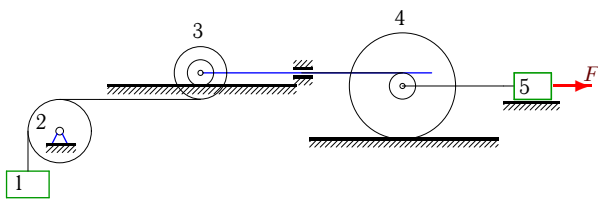
*Юшин Илья*



$$\begin{aligned}
 R_3 &= 2, r_3 = 1, \rho_3 = 1, \\
 R_4 &= 4, r_4 = 1, \rho_4 = 3, \\
 m_1 &= 22, m_2 = 6, \\
 m_3 &= 72, m_4 = 63, \\
 m_5 &= 6.
 \end{aligned}$$

**Задача D-33.35.**

*Ярилин Иван*



$$\begin{aligned}
 R_3 &= 2, r_3 = 1, \rho_3 = 1, \\
 R_4 &= 4, r_4 = 1, \rho_4 = 3, \\
 m_1 &= 14, m_2 = 8, \\
 m_3 &= 4, m_4 = 3, \\
 m_5 &= 50.
 \end{aligned}$$

D-33

**Ответы.**

**Кинетическая энергия системы. Приведенные массы** 09.11.2013

| №  | $\mu_1$ | $\mu_2$ | $\mu_3$ | $\mu_4$ | $\mu_5$ | $\sum_{k=1}^5 \mu_k$ |                    |
|----|---------|---------|---------|---------|---------|----------------------|--------------------|
| 1  | 13      | 3       | 41      | 27      | 81      | 165                  | Акулина Даша       |
| 2  | 18      | 2       | 20      | 39      | 8       | 87                   | Анарбаев Б.        |
| 3  | 14      | 2       | 52      | 3       | 1       | 72                   | Баранов Максим     |
| 4  | 5       | 3       | 65      | 16      | 256     | 345                  | Бибирли Эмиль      |
| 5  | 9       | 5       | 15      | 52      | 9       | 90                   | Биль Евгений       |
| 6  | 16      | 4       | 8       | 120     | 8       | 156                  | Волковой Илья      |
| 7  | 6       | 1       | 100     | 125     | 225     | 457                  | Глядяев А.Д.       |
| 8  | 11      | 3       | 80      | 75      | 128     | 297                  | Горбатенко Егор    |
| 9  | 11      | 1       | 8       | 15      | 8       | 43                   | Губин Иван         |
| 10 | 4       | 4       | 52      | 369     | 900     | 1329                 | Драгин Егор        |
| 11 | 12      | 5       | 80      | 39      | 8       | 144                  | Исаков Александр   |
| 12 | 10      | 4       | 104     | 164     | 100     | 382                  | Картушин Александр |
| 13 | 16      | 6       | 52      | 216     | 225     | 515                  | Костина Даша       |
| 14 | 19      | 6       | 16      | 14      | 6       | 61                   | Лбова Александра   |
| 15 | 21      | 5       | 40      | 15      | 8       | 89                   | Муржи Николай      |
| 16 | 15      | 1       | 175     | 128     | 320     | 639                  | Никитенков Федор   |
| 17 | 18      | 1       | 56      | 8       | 4       | 87                   | Новиков Павел      |
| 18 | 17      | 1       | 40      | 6       | 2       | 66                   | Опитев Владислав   |
| 19 | 12      | 2       | 12      | 15      | 2       | 43                   | Оршак Сергей       |
| 20 | 13      | 5       | 52      | 156     | 16      | 242                  | Парашин Андрей     |
| 21 | 12      | 3       | 32      | 3       | 1       | 51                   | Парохин Антон      |
| 22 | 13      | 5       | 8       | 9       | 2       | 37                   | Пархоменко Иван    |
| 23 | 21      | 5       | 4       | 15      | 2       | 47                   | Петров Кирилл      |
| 24 | 15      | 4       | 20      | 120     | 32      | 191                  | Петухов Антон      |
| 25 | 11      | 6       | 52      | 13      | 1       | 83                   | Руфин Никита       |
| 26 | 6       | 5       | 52      | 75      | 32      | 170                  | Самойлов Никита    |
| 27 | 20      | 1       | 20      | 6       | 2       | 49                   | Семенова Ирина     |
| 28 | 9       | 5       | 12      | 25      | 2       | 53                   | Слявин Ярослав     |
| 29 | 13      | 4       | 175     | 45      | 81      | 318                  | Сюлюкин Кирилл     |
| 30 | 9       | 2       | 18      | 30      | 64      | 123                  | Хачалов Магомед    |
| 31 | 18      | 2       | 52      | 351     | 18      | 441                  | Чаймелов Андрей    |
| 32 | 9       | 1       | 20      | 96      | 32      | 158                  | Чумаков Иван       |
| 33 | 6       | 2       | 12      | 75      | 8       | 103                  | Шубин Станислав    |
| 34 | 22      | 3       | 16      | 70      | 6       | 117                  | Юшин Илья          |
| 35 | 14      | 4       | 8       | 3       | 32      | 61                   | Ярилин Иван        |

D-33 файл o33dFFA