

Кинематические инварианты

В некоторый момент времени известны скорости трех точек тела, движущегося в пространстве. Заданы координаты этих точек. Найти кинематические инварианты движения.

Задача К-29.1.

5

$$A = (2, 1, 0), B = (-1, 2, 0), C = (0, 1, 0),$$
$$\vec{v}_A = (-4, -5, -1),$$
$$\vec{v}_B = (4, 19, 19),$$
$$\vec{v}_C = (-4, 11, 15).$$

Задача К-29.2.

5

$$A = (0, 2, 0), B = (3, 1, 2), C = (0, 0, 0),$$
$$\vec{v}_A = (-8, -8, -2),$$
$$\vec{v}_B = (-14, 24, 23),$$
$$\vec{v}_C = (24, -8, -18).$$

Задача К-29.3.

5

$$A = (0, 2, 0), B = (1, 1, 3), C = (0, 0, 2),$$
$$\vec{v}_A = (-1, 4, 3),$$
$$\vec{v}_B = (-9, 14, 9),$$
$$\vec{v}_C = (-1, 8, 7).$$

Задача К-29.4.

5

$$A = (0, 1, 0), B = (2, 2, 1), C = (1, 0, 1),$$
$$\vec{v}_A = (-1, 2, -4),$$
$$\vec{v}_B = (3, -15, 5),$$
$$\vec{v}_C = (-13, -7, -1).$$

Задача К-29.5.

5

$$A = (1, 1, 2), B = (2, 1, 1), C = (1, 1, 1),$$
$$\vec{v}_A = (4, -7, -2),$$
$$\vec{v}_B = (-8, -18, -14),$$
$$\vec{v}_C = (-8, -6, -2).$$

Задача К-29.6.

5

$$A = (2, 2, 0), B = (1, 1, 2), C = (0, 1, 0),$$
$$\vec{v}_A = (-3, -1, 4),$$
$$\vec{v}_B = (9, -3, 9),$$
$$\vec{v}_C = (3, -13, 12).$$

Задача К-29.7.

5

$$A = (0, 1, 0), B = (2, 1, 1), C = (0, 5, 0),$$
$$\vec{v}_A = (-8, -8, -3),$$
$$\vec{v}_B = (-19, -32, 19),$$
$$\vec{v}_C = (56, -8, -35).$$

Задача К-29.8.

5

$$A = (0, 1, 0), B = (2, 1, 1), C = (2, 3, 0),$$
$$\vec{v}_A = (-5, 3, 5),$$
$$\vec{v}_B = (-9, -15, 13),$$
$$\vec{v}_C = (9, -11, 21).$$

Задача К-29.9.

5

$$A = (1, 2, 2), B = (3, -1, -1), C = (0, 0, 1),$$
$$\vec{v}_A = (2, -2, -1),$$
$$\vec{v}_B = (29, 16, -1),$$
$$\vec{v}_C = (17, -6, -8).$$

Задача К-29.10.

5

$$A = (1, 0, 1), B = (0, -1, 1), C = (2, 0, 1),$$
$$\vec{v}_A = (4, 8, -3),$$
$$\vec{v}_B = (-10, 22, 4),$$
$$\vec{v}_C = (4, -6, -8).$$

Задача К-29.11.

5

$$A = (2, 2, 1), B = (0, 1, 0), C = (0, 3, -1),$$
$$\vec{v}_A = (-2, 6, 3),$$
$$\vec{v}_B = (1, -12, 15),$$
$$\vec{v}_C = (-17, -16, 7).$$

Задача К-29.12.

5

$$A = (1, 1, 1), B = (1, 1, 2), C = (0, -1, 0),$$
$$\vec{v}_A = (2, 8, 5),$$
$$\vec{v}_B = (-4, 14, 5),$$
$$\vec{v}_C = (22, -5, 11).$$

Задача К-29.13.

5

$$A = (1, 2, 1), B = (0, 0, 0), C = (2, 2, -1),$$
$$\vec{v}_A = (1, -4, -1),$$
$$\vec{v}_B = (5, -6, -1),$$
$$\vec{v}_C = (-7, 4, -5).$$

Задача К-29.14.

5

$$A = (1, 1, 1), B = (0, 2, 1), C = (2, 3, 0),$$
$$\vec{v}_A = (3, -7, 2),$$
$$\vec{v}_B = (10, 0, 14),$$
$$\vec{v}_C = (11, -8, 8).$$

Задача К-29.15.

5

$$A = (0, 2, 1), B = (2, 2, 2), C = (2, 2, 0),$$
$$\vec{v}_A = (-7, 3, -3),$$
$$\vec{v}_B = (-13, 11, 9),$$
$$\vec{v}_C = (-1, 23, 9).$$

Задача К-29.17.

5

$$A = (0, 1, 0), B = (1, 3, 0), C = (-1, 1, 0),$$
$$\vec{v}_A = (-2, 1, -5),$$
$$\vec{v}_B = (-18, 9, -3),$$
$$\vec{v}_C = (-2, -7, -9).$$

Задача К-29.19.

5

$$A = (1, 1, 1), B = (1, 1, 2), C = (0, 0, 1),$$
$$\vec{v}_A = (6, -4, 1),$$
$$\vec{v}_B = (12, 2, 1),$$
$$\vec{v}_C = (13, -11, 13).$$

Задача К-29.21.

5

$$A = (1, 0, 2), B = (2, -1, 0), C = (1, 1, 0),$$
$$\vec{v}_A = (1, 8, -4),$$
$$\vec{v}_B = (9, 8, 0),$$
$$\vec{v}_C = (25, 16, 0).$$

Задача К-29.23.

5

$$A = (0, 1, 1), B = (1, 1, 0), C = (1, 1, -1),$$
$$\vec{v}_A = (-6, 4, 4),$$
$$\vec{v}_B = (0, -9, 10),$$
$$\vec{v}_C = (6, -15, 10).$$

Задача К-29.25.

5

$$A = (1, 1, 2), B = (2, 1, 0), C = (1, 2, 0),$$
$$\vec{v}_A = (4, 7, 4),$$
$$\vec{v}_B = (28, 21, 16),$$
$$\vec{v}_C = (16, 9, 5).$$

Задача К-29.27.

5

$$A = (0, 1, 1), B = (0, 1, 2), C = (2, 0, 1),$$
$$\vec{v}_A = (-2, -4, -1),$$
$$\vec{v}_B = (-8, -2, -1),$$
$$\vec{v}_C = (-11, -22, 13).$$

Задача К-29.16.

5

$$A = (1, 2, 2), B = (-1, 1, 1), C =$$
$$(-1, 3, 1),$$
$$\vec{v}_A = (3, -5, -2),$$
$$\vec{v}_B = (6, -23, 10),$$
$$\vec{v}_C = (-8, -23, 2).$$

Задача К-29.18.

5

$$A = (0, 0, 0), B = (1, -1, 0), C =$$
$$(0, -1, 2),$$
$$\vec{v}_A = (-7, 8, -5),$$
$$\vec{v}_B = (-19, -4, 12),$$
$$\vec{v}_C = (-37, 24, 3).$$

Задача К-29.20.

5

$$A = (1, 2, 1), B = (3, 0, 2), C = (1, 1, 1),$$
$$\vec{v}_A = (8, -3, 1),$$
$$\vec{v}_B = (20, 20, 23),$$
$$\vec{v}_C = (20, -3, 0).$$

Задача К-29.22.

5

$$A = (2, 2, 1), B = (0, 0, 1), C = (1, 1, 0),$$
$$\vec{v}_A = (-7, 6, -1),$$
$$\vec{v}_B = (15, -16, 23),$$
$$\vec{v}_C = (-6, -7, 11).$$

Задача К-29.24.

5

$$A = (0, 2, 1), B = (3, 0, 0), C = (1, 0, 1),$$
$$\vec{v}_A = (-3, -1, 2),$$
$$\vec{v}_B = (12, 19, 7),$$
$$\vec{v}_C = (9, 5, 1).$$

Задача К-29.26.

5

$$A = (0, 2, 1), B = (2, 2, 1), C = (2, 1, -1),$$
$$\vec{v}_A = (-6, 5, -1),$$
$$\vec{v}_B = (-6, 29, 23),$$
$$\vec{v}_C = (30, 31, 22).$$

Задача К-29.28.

5

$$A = (1, 2, 1), B = (1, 0, 2), C = (0, 0, 0),$$
$$\vec{v}_A = (6, -2, 2),$$
$$\vec{v}_B = (24, 2, 10),$$
$$\vec{v}_C = (16, -13, 14).$$

К-29 Ответы.**Кинематические инварианты**

30.10.2013

| № | ω_x | ω_y | ω_z | ω | $\vec{\omega} \cdot \vec{v}_A$ |
|----|------------|------------|------------|----------|--------------------------------|
| 1 | -4 | 8 | -8 | 12 | -16 |
| 2 | 8 | -11 | 16 | 21 | -8 |
| 3 | -2 | -4 | 4 | 6 | -2 |
| 4 | 1 | -4 | -8 | 9 | 23 |
| 5 | 1 | 12 | -12 | 17 | -56 |
| 6 | -2 | 3 | 6 | 7 | 27 |
| 7 | -8 | -11 | -16 | 21 | 200 |
| 8 | 4 | -4 | -7 | 9 | -67 |
| 9 | 2 | -3 | 6 | 7 | 4 |
| 10 | -2 | 5 | -14 | 15 | 74 |
| 11 | -4 | 4 | 7 | 9 | 53 |
| 12 | -6 | -6 | 7 | 11 | -25 |
| 13 | 2 | 4 | 4 | 6 | -18 |
| 14 | 6 | 6 | -7 | 11 | -38 |
| 15 | 6 | -6 | 7 | 11 | -81 |
| 16 | -4 | 4 | 7 | 9 | -46 |
| 17 | -1 | -4 | 8 | 9 | -42 |
| 18 | -8 | -9 | -12 | 17 | 44 |
| 19 | -6 | 6 | 7 | 11 | -53 |
| 20 | 1 | -12 | 12 | 17 | 56 |
| 21 | 4 | -8 | -8 | 12 | -28 |
| 22 | -2 | 10 | 11 | 15 | 63 |
| 23 | -6 | -6 | -7 | 11 | -16 |
| 24 | 2 | -3 | 6 | 7 | 9 |
| 25 | 1 | -12 | 12 | 17 | -32 |
| 26 | 1 | -12 | 12 | 17 | -78 |
| 27 | -2 | -6 | -9 | 11 | 37 |
| 28 | -4 | 4 | 7 | 9 | -18 |

К-29 файл о29к5А