# 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.** [2]
$A = (0, 1, 1)$, $B = (1, 3, 1)$, $C = (2, 3, 1)$,
$\vec{v}_A = (-4, 1, -2)$,
$\vec{v}_B = (4, -3, -2)$,
$\vec{v}_C = (4, -7, 2)$.

**Задача К-29.2.** [2]
$A = (1, 2, 1)$, $B = (2, 0, 1)$, $C = (2, -1, 0)$,
$\vec{v}_A = (2, 8, -3)$,
$\vec{v}_B = (16, 15, -9)$,
$\vec{v}_C = (29, 21, -15)$.

**Задача К-29.3.** [2]
$A = (2, 2, 0)$, $B = (0, 1, 1)$, $C = (0, 2, 0)$,
$\vec{v}_A = (-2, -5, -3)$,
$\vec{v}_B = (10, -20, 6)$,
$\vec{v}_C = (-2, -17, 9)$.

**Задача К-29.4.** [2]
$A = (1, 0, 1)$, $B = (2, 2, 3)$, $C = (3, 1, 2)$,
$\vec{v}_A = (8, 3, -5)$,
$\vec{v}_B = (8, -11, 9)$,
$\vec{v}_C = (8, -22, 20)$.

**Задача К-29.5.** [2]
$A = (0, 1, 0)$, $B = (2, 0, 3)$, $C = (2, 0, 2)$,
$\vec{v}_A = (-2, 6, 4)$,
$\vec{v}_B = (-21, -20, 8)$,
$\vec{v}_C = (-17, -16, 8)$.

**Задача К-29.6.** [2]
$A = (2, 2, 1)$, $B = (0, 1, 0)$, $C = (0, 0, 0)$,
$\vec{v}_A = (-8, 5, 4)$,
$\vec{v}_B = (-7, -19, 26)$,
$\vec{v}_C = (4, -19, 28)$.

**Задача К-29.7.** [2]
$A = (0, 1, 1)$, $B = (1, 1, -1)$, $C = (3, 1, 0)$,
$\vec{v}_A = (-1, -6, -1)$,
$\vec{v}_B = (11, -6, 5)$,
$\vec{v}_C = (5, -21, 17)$.

**Задача К-29.8.** [2]
$A = (2, 1, 0)$, $B = (0, 2, 1)$, $C = (0, 2, 0)$,
$\vec{v}_A = (-4, 6, 3)$,
$\vec{v}_B = (-5, -2, 9)$,
$\vec{v}_C = (-11, -8, 9)$.

**Задача К-29.9.** [2]
$A = (1, 1, 2)$, $B = (-1, 2, 0)$, $C = (0, 1, 0)$,
$\vec{v}_A = (2, -8, 2)$,
$\vec{v}_B = (-17, -34, 8)$,
$\vec{v}_C = (-10, -27, 8)$.

**Задача К-29.10.** [2]
$A = (2, 0, 1)$, $B = (1, 0, -1)$, $C = (2, 1, -1)$,
$\vec{v}_A = (-3, -7, -1)$,
$\vec{v}_B = (-15, -12, 5)$,
$\vec{v}_C = (-8, -19, -7)$.

**Задача К-29.11.** [2]
$A = (2, 0, 1)$, $B = (1, 2, 1)$, $C = (3, 2, 1)$,
$\vec{v}_A = (-7, 3, -5)$,
$\vec{v}_B = (7, 10, 13)$,
$\vec{v}_C = (7, -4, 1)$.

**Задача К-29.12.** [2]
$A = (0, 1, 0)$, $B = (2, 2, 1)$, $C = (2, 1, 0)$,
$\vec{v}_A = (-1, 8, 4)$,
$\vec{v}_B = (-1, -12, 24)$,
$\vec{v}_C = (-1, -8, 20)$.

**Задача К-29.13.** [2]
$A = (0, 0, 1)$, $B = (2, 0, 1)$, $C = (2, 0, 0)$,
$\vec{v}_A = (-5, -7, -5)$,
$\vec{v}_B = (-5, -35, 5)$,
$\vec{v}_C = (0, -37, 5)$.

**Задача К-29.14.** [2]
$A = (1, 2, 1)$, $B = (5, 2, 1)$, $C = (0, 2, 1)$,
$\vec{v}_A = (5, 3, 5)$,
$\vec{v}_B = (5, 31, -11)$,
$\vec{v}_C = (5, -4, 9)$.

**Задача K-29.15.** [2]
$A = (1, 2, 2)$, $B = (0, 1, 2)$, $C = (-1, 2, 0)$,
$\vec{v}_A = (1, 3, -4)$,
$\vec{v}_B = (7, -3, 1)$,
$\vec{v}_C = (-5, -13, 2)$.

**Задача K-29.16.** [2]
$A = (2, 1, 1)$, $B = (0, 2, 2)$, $C = (2, 1, 2)$,
$\vec{v}_A = (-7, 4, -5)$,
$\vec{v}_B = (17, 29, 18)$,
$\vec{v}_C = (5, 5, -5)$.

**Задача K-29.17.** [2]
$A = (2, 1, 1)$, $B = (1, 1, 0)$, $C = (2, 2, 1)$,
$\vec{v}_A = (-5, 5, 4)$,
$\vec{v}_B = (-11, 18, 10)$,
$\vec{v}_C = (2, 5, 10)$.

**Задача K-29.18.** [2]
$A = (0, 2, 1)$, $B = (1, 0, 0)$, $C = (0, 1, 1)$,
$\vec{v}_A = (-4, 2, 1)$,
$\vec{v}_B = (20, 9, 11)$,
$\vec{v}_C = (5, 2, 3)$.

**Задача K-29.19.** [2]
$A = (1, 2, 2)$, $B = (1, 1, -1)$, $C = (0, 0, 0)$,
$\vec{v}_A = (6, -8, 5)$,
$\vec{v}_B = (6, -17, 8)$,
$\vec{v}_C = (22, -26, 15)$.

**Задача K-29.20.** [2]
$A = (0, 2, 0)$, $B = (2, 1, 1)$, $C = (0, 6, 0)$,
$\vec{v}_A = (-1, 5, -1)$,
$\vec{v}_B = (2, 21, 9)$,
$\vec{v}_C = (-37, 5, 7)$.

**Задача K-29.21.** [2]
$A = (1, 1, 2)$, $B = (2, 1, 3)$, $C = (0, 0, 1)$,
$\vec{v}_A = (8, -8, 5)$,
$\vec{v}_B = (-3, 16, 16)$,
$\vec{v}_C = (35, -32, 2)$.

**Задача K-29.22.** [2]
$A = (0, 2, 1)$, $B = (1, 1, 1)$, $C = (2, 2, 0)$,
$\vec{v}_A = (-7, -2, -1)$,
$\vec{v}_B = (1, 6, 3)$,
$\vec{v}_C = (1, 18, 15)$.

**Задача K-29.23.** [2]
$A = (-3, 1, 0)$, $B = (0, 1, 0)$, $C = (0, 0, -1)$,
$\vec{v}_A = (-6, -2, 4)$,
$\vec{v}_B = (-6, 19, 16)$,
$\vec{v}_C = (5, 15, 20)$.

**Задача K-29.24.** [2]
$A = (1, 1, 1)$, $B = (2, 2, 2)$, $C = (2, 1, 1)$,
$\vec{v}_A = (4, 7, -3)$,
$\vec{v}_B = (-20, 18, 10)$,
$\vec{v}_C = (4, 19, 9)$.

**Задача K-29.25.** [2]
$A = (0, 2, 1)$, $B = (1, 0, 1)$, $C = (0, 6, 1)$,
$\vec{v}_A = (-2, 1, 1)$,
$\vec{v}_B = (14, 9, 7)$,
$\vec{v}_C = (-34, 1, -3)$.

**Задача K-29.26.** [2]
$A = (2, 1, 1)$, $B = (1, 2, 0)$, $C = (2, 2, 0)$,
$\vec{v}_A = (-1, 8, 5)$,
$\vec{v}_B = (-1, 20, 17)$,
$\vec{v}_C = (-1, 12, 9)$.

**Задача K-29.27.** [2]
$A = (0, 1, 0)$, $B = (2, 1, 2)$, $C = (1, 1, 0)$,
$\vec{v}_A = (-1, 2, -1)$,
$\vec{v}_B = (-9, -16, 7)$,
$\vec{v}_C = (-1, -6, 3)$.

**Задача K-29.28.** [2]
$A = (1, 2, 2)$, $B = (2, -1, 2)$, $C = (0, 0, 1)$,
$\vec{v}_A = (5, 8, -1)$,
$\vec{v}_B = (38, 19, 3)$,
$\vec{v}_C = (37, -1, -15)$.

| № | $\omega_x$ | $\omega_y$ | $\omega_z$ | $\omega$ | $\vec{\omega} \cdot \vec{v}_A$ |
|----|-----|-----|-----|----|------|
| 1  | -2  | -4  | -4  | 6  | 12   |
| 2  | 6   | -6  | 7   | 11 | -57  |
| 3  | 3   | 6   | 6   | 9  | -54  |
| 4  | 1   | -12 | -12 | 17 | 32   |
| 5  | 4   | -4  | -7  | 9  | -60  |
| 6  | -2  | 10  | 11  | 15 | 110  |
| 7  | 3   | -6  | -6  | 9  | 39   |
| 8  | -6  | 6   | 7   | 11 | 81   |
| 9  | -6  | 6   | 7   | 11 | -46  |
| 10 | -6  | 6   | -7  | 11 | -17  |
| 11 | 6   | 6   | -7  | 11 | 11   |
| 12 | 4   | -8  | -8  | 12 | -100 |
| 13 | -2  | -5  | -14 | 15 | 115  |
| 14 | -4  | 4   | 7   | 9  | 27   |
| 15 | -2  | 3   | 6   | 7  | -17  |
| 16 | -1  | 12  | -12 | 17 | 115  |
| 17 | 6   | 6   | -7  | 11 | -28  |
| 18 | -2  | -6  | 9   | 11 | 5    |
| 19 | -3  | 4   | 12  | 13 | 10   |
| 20 | 2   | -6  | 9   | 11 | -41  |
| 21 | -8  | -11 | 16  | 21 | 104  |
| 22 | 4   | -8  | 8   | 12 | -20  |
| 23 | -4  | -4  | 7   | 9  | 60   |
| 24 | 1   | -12 | 12  | 17 | -116 |
| 25 | -1  | -4  | 8   | 9  | 6    |
| 26 | 4   | 8   | -8  | 12 | 20   |
| 27 | 1   | -4  | -8  | 9  | -1   |
| 28 | 2   | -10 | 11  | 15 | -81  |

*К-29* файл     o29k2A