

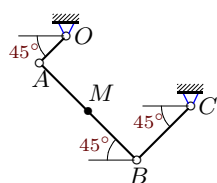
Движение точки по звену механизма

Плоский шарнирно-стержневой механизм приводится в движение кривошипом OA , который вращается против часовой стрелки с постоянной угловой скоростью ω . Вдоль стержня A движется точка M по закону $AM = \sigma(t)$ или $BM = \sigma(t)$. Положение механизма при $t = t_1$ указано на рисунке. Все размеры даны в см. Стержни, положение которых не задано углом, горизонтальны или вертикальны. Найти абсолютную скорость и абсолютное ускорение точки M в этот момент.

Кирсанов М.Н. Решебник. Теоретическая механика с. 209.

Вариант 1

K12.



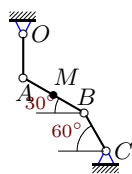
$$\omega_{OA} = 3 \frac{1}{c},$$

$$BM = 16t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=36, BC=20$$

Вариант 2

K12.



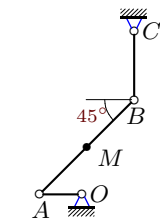
$$\omega_{OA} = 2 \frac{1}{c},$$

$$BM = 6t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=16, BC=10$$

Вариант 3

K12.



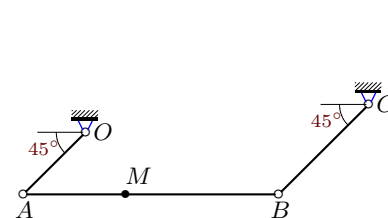
$$\omega_{OA} = 1.3 \frac{1}{c},$$

$$AM = 7t(2 + \cos(\pi t/3)); t = 6 \text{ c},$$

$$OA=80, AB=252, BC=130$$

Вариант 4

K12.



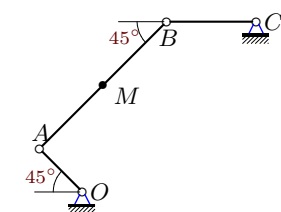
$$\omega_{OA} = 0.7 \frac{1}{c},$$

$$AM = 13(\sin(\pi t/6) + t^2); t = 3 \text{ c},$$

$$OA=112, AB=325, BC=162$$

Вариант 5

K12.



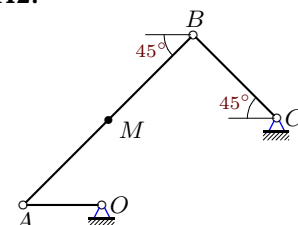
$$\omega_{OA} = 0.6 \frac{1}{c},$$

$$AM = 11(\sin(\pi t/6) + t^2); t = 5 \text{ c},$$

$$OA=190, AB=561, BC=280$$

Вариант 6

K12.



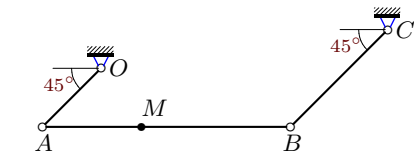
$$\omega_{OA} = 0.6 \frac{1}{c},$$

$$AM = 6(\sin(\pi t/6) + t^2); t = 5 \text{ c},$$

$$OA=100, AB=306, BC=150$$

Вариант 7

K12.



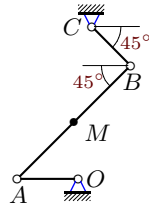
$$\omega_{OA} = 2 \frac{1}{c},$$

$$AM = 6t(2 + \cos(\pi t/3)); t = 4 \text{ c},$$

$$OA=30, AB=90, BC=50$$

Вариант 8

K12.



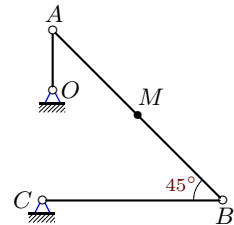
$$\omega_{OA} = 1.4 \frac{1}{c},$$

$$AM = 18t + 8 \sin^2(\pi t/3); t = 3 \text{ c},$$

$$OA=41, AB=108, BC=37$$

Вариант 9

K12.



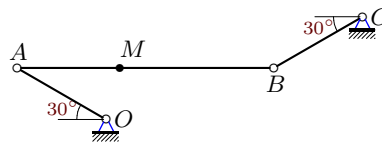
$$\omega_{OA} = 3.2 \frac{1}{c},$$

$$BM = 18t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=40, BC=30$$

Вариант 10

K12.



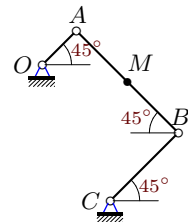
$$\omega_{OA} = 1.3 \frac{1}{c},$$

$$AM = 6t + 8 \sin^2(\pi t/4); t = 2 \text{ c},$$

$$OA=20, AB=50, BC=20$$

Вариант 11

K12.



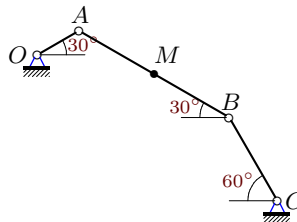
$$\omega_{OA} = 2.5 \frac{1}{c},$$

$$BM = 10(\sin(\pi t/6) + t^2); t = 1 \text{ c},$$

$$OA=10, AB=30, BC=20$$

Вариант 12

K12.



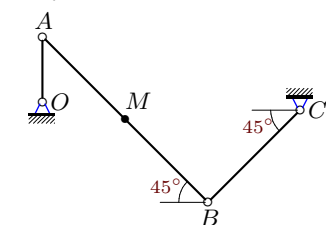
$$\omega_{OA} = 2.9 \frac{1}{c},$$

$$BM = 12(\sin(\pi t/6) + t^2); t = 1 \text{ c},$$

$$OA=10, AB=36, BC=20$$

Вариант 13

K12.



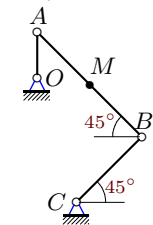
$$\omega_{OA} = 3 \frac{1}{c},$$

$$BM = 16t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=36, BC=20$$

Вариант 14

K12.



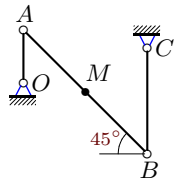
$$\omega_{OA} = 2.8 \frac{1}{c},$$

$$BM = 14t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=32, BC=20$$

Вариант 15

K12.



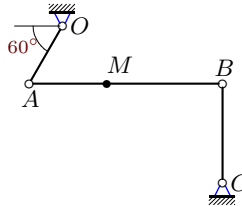
$$\omega_{OA} = 2.7 \frac{1}{c},$$

$$BM = 11(\sin(\pi t/6) + t^2); t = 1 \text{ c},$$

$$OA=10, AB=33, BC=20$$

Вариант 16

K12.



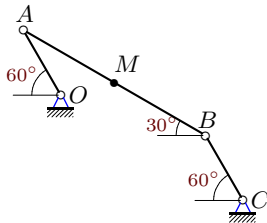
$$\omega_{OA} = 0.7 \frac{1}{c},$$

$$AM = 7(\sin(\pi t/6) + t^2); t = 3 \text{ c},$$

$$OA=60, AB=175, BC=90$$

Вариант 17

K12.



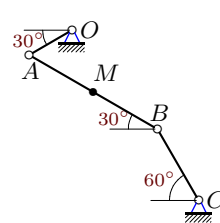
$$\omega_{OA} = 2.6 \frac{1}{c},$$

$$BM = 12t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=28, BC=10$$

Вариант 18

K12.



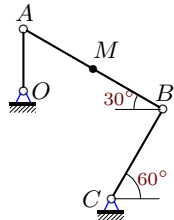
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$BM = 15t(2 + \cos(\pi t/3)); t = 2 \text{ c},$$

$$OA=30, AB=90, BC=50$$

Вариант 19

K12.



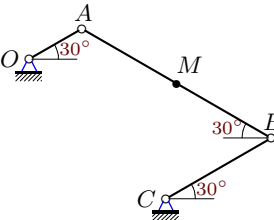
$$\omega_{OA} = 1.1 \frac{1}{c},$$

$$BM = 13t(2 + \cos(\pi t/3)); t = 2 \text{ c},$$

$$OA=30, AB=78, BC=50$$

Вариант 20

K12.



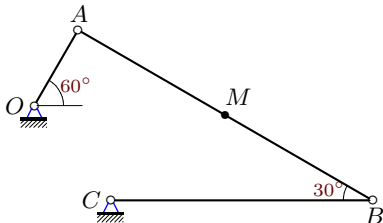
$$\omega_{OA} = 2.9 \frac{1}{c},$$

$$BM = 12(\sin(\pi t/6) + t^2); t = 1 \text{ c},$$

$$OA=10, AB=36, BC=20$$

Вариант 21

K12.



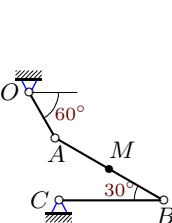
$$\omega_{OA} = 3.2 \frac{1}{c},$$

$$BM = 13(\sin(\pi t/6) + t^2); t = 1 \text{ c},$$

$$OA=10, AB=39, BC=30$$

Вариант 22

K12.



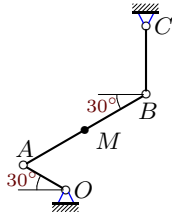
$$\omega_{OA} = 2.4 \frac{1}{c},$$

$$BM = 10t + 8 \sin^2(\pi t/6); t = 1 \text{ c},$$

$$OA=10, AB=24, BC=20$$

Вариант 23

K12.



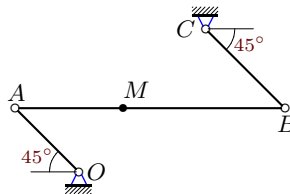
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$AM = 8t(2 + \cos(\pi t/3)); t = 6 \text{ c},$$

$$OA=100, AB=288, BC=140$$

Вариант 24

K12.



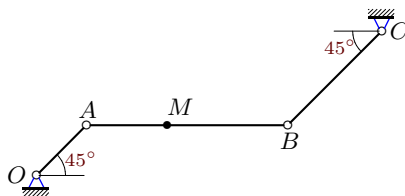
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$AM = 20t + 8 \sin^2(\pi t/4); t = 2 \text{ c},$$

$$OA=40, AB=120, BC=50$$

Вариант 25

K12.



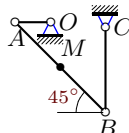
$$\omega_{OA} = 0.7 \frac{1}{c},$$

$$AM = 14(\sin(\pi t/6) + t^2); t = 3 \text{ c},$$

$$OA=123, AB=350, BC=232$$

Вариант 26

K12.



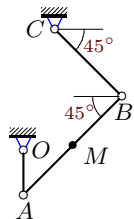
$$\omega_{OA} = 2.9 \frac{1}{c},$$

$$BM = 6(\sin(\pi t/6) + t^2); t = 1 \text{ c},$$

$$OA=5, AB=18, BC=12$$

Вариант 27

K12.



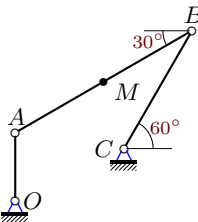
$$\omega_{OA} = 0.6 \frac{1}{c},$$

$$AM = 7(\sin(\pi t/6) + t^2); t = 5 \text{ c},$$

$$OA=116, AB=357, BC=243$$

Вариант 28

K12.



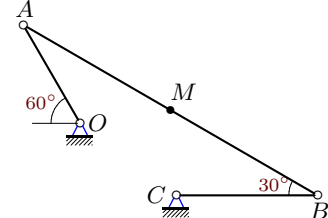
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$AM = 10t + 8 \sin^2(\pi t/3); t = 3 \text{ c},$$

$$OA=20, AB=60, BC=40$$

Вариант 29

K12.



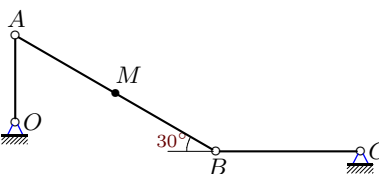
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$BM = 10t(8 - t); t = 2 \text{ c},$$

$$OA=80, AB=240, BC=100$$

Вариант 30

K12.



$$\omega_{OA} = 2.1 \frac{1}{c},$$

$$BM = 8t(6 - t); t = 1 \text{ c},$$

$$OA=30, AB=80, BC=50$$

Ответы

| | ω_e | ε_e | v_r^T | v_e | v | W_r^T | W_e | W_C | W |
|----|------------|-----------------|---------|--------|--------|---------|--------|--------|--------|
| 1 | -0.00 | -1.25 | -19.63 | 30.00 | 10.37 | -2.19 | 67.50 | 0.00 | 67.54 |
| 2 | 1.25 | -22.04 | -9.63 | 26.46 | 21.43 | -2.19 | 145.33 | 24.07 | 169.31 |
| 3 | 0.58 | 0.81 | 21.00 | 73.54 | 52.54 | -46.06 | 53.04 | 24.51 | 31.37 |
| 4 | -0.00 | -0.07 | 78.00 | 78.40 | 144.49 | 22.44 | 48.58 | 0.00 | 67.86 |
| 5 | -0.20 | -0.15 | 105.01 | 127.46 | 57.70 | 20.49 | 112.02 | 42.68 | 154.36 |
| 6 | 0.14 | 0.04 | 57.28 | 47.43 | 25.90 | 11.18 | 29.29 | 15.88 | 33.81 |
| 7 | -0.00 | -0.75 | 30.77 | 60.00 | 84.60 | 24.04 | 102.61 | 0.00 | 123.24 |
| 8 | 0.38 | 0.94 | 18.00 | 45.38 | 30.37 | 17.55 | 49.58 | 13.53 | 67.15 |
| 9 | 1.13 | 0.07 | -21.63 | 22.63 | 44.26 | -2.19 | 84.99 | 48.94 | 127.91 |
| 10 | 0.90 | 2.08 | 6.00 | 13.76 | 8.32 | -9.87 | 27.95 | 10.81 | 35.67 |
| 11 | 0.00 | 1.04 | -24.53 | 25.00 | 49.53 | -18.63 | 46.88 | 0.00 | 50.44 |
| 12 | -1.61 | -11.50 | -29.44 | 29.00 | 56.45 | -22.36 | 293.65 | 94.87 | 215.85 |
| 13 | 0.59 | 2.39 | -19.63 | 23.72 | 42.20 | -2.19 | 60.96 | 23.13 | 70.40 |
| 14 | 0.62 | 1.12 | -17.63 | 22.14 | 38.71 | -2.19 | 61.96 | 21.81 | 75.77 |
| 15 | 0.00 | 4.69 | -26.99 | 27.00 | 49.88 | -20.49 | 57.63 | 0.00 | 40.36 |
| 16 | 0.12 | -0.22 | 42.00 | 38.49 | 79.38 | 12.08 | 17.04 | 10.08 | 32.76 |
| 17 | -0.00 | -0.00 | -15.63 | 26.00 | 36.42 | -2.19 | 67.60 | 0.00 | 65.71 |
| 18 | 0.80 | -2.84 | 4.71 | 36.00 | 40.15 | 10.76 | 90.52 | 7.53 | 82.78 |
| 19 | 0.21 | 0.19 | 4.08 | 29.75 | 25.85 | 9.32 | 28.98 | 1.73 | 33.96 |
| 20 | -0.00 | 1.35 | -29.44 | 29.00 | 56.45 | -22.36 | 64.23 | 0.00 | 80.66 |
| 21 | 1.42 | -0.88 | -31.89 | 42.33 | 69.65 | -24.22 | 125.84 | 90.66 | 219.59 |
| 22 | -1.73 | 5.20 | -13.63 | 12.00 | 1.63 | -2.19 | 125.24 | 47.21 | 164.02 |
| 23 | 0.42 | 0.80 | 24.00 | 103.92 | 79.92 | -52.64 | 47.92 | 20.00 | 12.08 |
| 24 | 0.00 | 1.91 | 20.00 | 60.00 | 47.99 | -9.87 | 69.53 | 0.00 | 60.62 |
| 25 | 0.00 | 0.37 | 84.00 | 86.10 | 65.12 | 24.16 | 43.67 | 0.00 | 20.78 |
| 26 | 1.14 | 0.08 | -14.72 | 10.25 | 4.47 | -11.18 | 35.39 | 33.54 | 7.54 |
| 27 | 0.14 | -0.05 | 66.83 | 55.02 | 118.62 | 13.04 | 32.76 | 18.42 | 54.70 |
| 28 | 0.50 | -0.52 | 10.00 | 39.69 | 33.99 | 17.55 | 62.22 | 10.00 | 46.22 |
| 29 | 0.87 | -0.65 | -40.00 | 60.00 | 100.00 | 20.00 | 180.56 | 69.28 | 252.46 |
| 30 | 1.58 | 10.25 | -32.00 | 63.00 | 92.11 | 16.00 | 297.27 | 100.80 | 195.38 |