

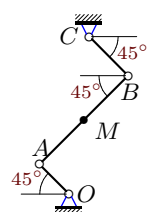
Движение точки по звену механизма

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.



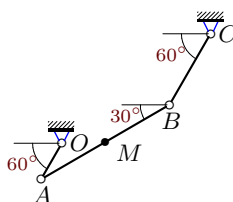
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$AM = 20t + 8 \sin^2(\pi t/3); t = 3 \text{ с},$$

$$OA=40, AB=120, BC=53$$

Вариант 2

K12.



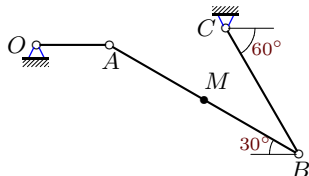
$$\omega_{OA} = 1.6 \frac{1}{c},$$

$$AM = 12t + 8 \sin^2(\pi t/3); t = 3 \text{ с},$$

$$OA=20, AB=72, BC=40$$

Вариант 3

K12.



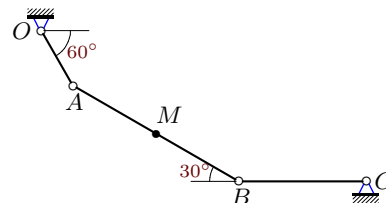
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$BM = 10t(2 + \cos(\pi t/3)); t = 2 \text{ с},$$

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

Вариант 4

K12.



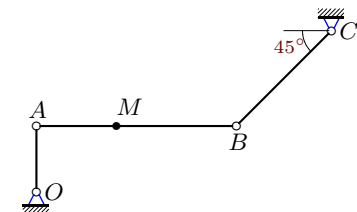
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$BM = 5t(8 - t); t = 2 \text{ с},$$

$$OA=40, AB=120, BC=80$$

Вариант 5

K12.



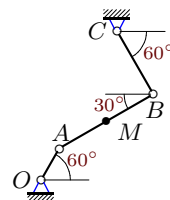
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$AM = 18t(5 - t); t = 2 \text{ с},$$

$$OA=89, AB=270, BC=182$$

Вариант 6

K12.



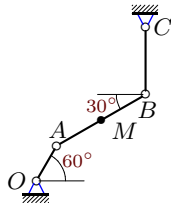
$$\omega_{OA} = 1.5 \frac{1}{c},$$

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

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

Вариант 7

K12.



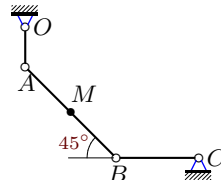
$$\omega_{OA} = 1.6 \frac{1}{c},$$

$$AM = 19t(3-t); t = 1 \text{ c},$$

$$OA=30, AB=76, BC=50$$

Вариант 8

K12.



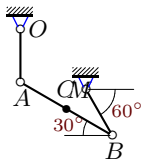
$$\omega_{OA} = 2.7 \frac{1}{c},$$

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

$$OA=12, AB=39, BC=25$$

Вариант 9

K12.



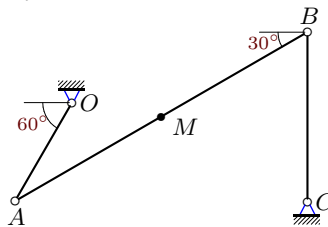
$$\omega_{OA} = 2.2 \frac{1}{c},$$

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

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

Вариант 10

K12.



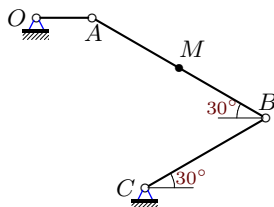
$$\omega_{OA} = 0.6 \frac{1}{c},$$

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

$$OA=120, AB=357, BC=180$$

Вариант 11

K12.



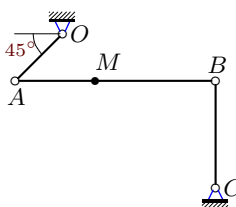
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$BM = 12t(2 + \cos(\pi t/3)); t = 2 \text{ c},$$

$$OA=20, AB=72, BC=50$$

Вариант 12

K12.



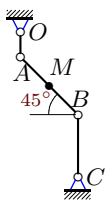
$$\omega_{OA} = 2 \frac{1}{c},$$

$$AM = 10t(2 + \cos(\pi t/3)); t = 4 \text{ c},$$

$$OA=50, AB=150, BC=80$$

Вариант 13

K12.



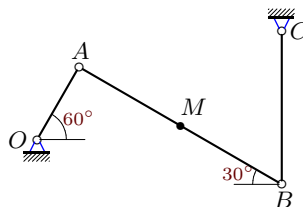
$$\omega_{OA} = 2.7 \frac{1}{c},$$

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

$$OA=12, AB=39, BC=30$$

Вариант 14

K12.



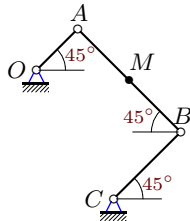
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$BM = 7t(8-t); t = 2 \text{ c},$$

$$OA=60, AB=168, BC=110$$

Вариант 15

K12.



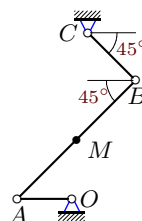
$$\omega_{OA} = 1.1 \frac{1}{c},$$

$$BM = 10t(2 + \cos(\pi t/3)); t = 2 \text{ c},$$

$$OA=24, AB=60, BC=39$$

Вариант 16

K12.



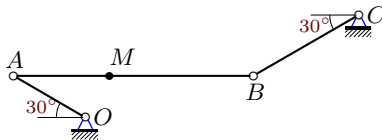
$$\omega_{OA} = 1.3 \frac{1}{c},$$

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

$$OA=165, AB=504, BC=203$$

Вариант 17

K12.



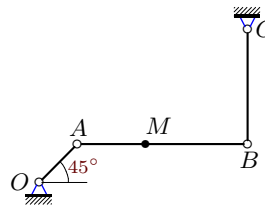
$$\omega_{OA} = 0.7 \frac{1}{c},$$

$$AM = 15(\sin(\pi t/6) + t^2); t = 3 \text{ c},$$

$$OA=130, AB=375, BC=190$$

Вариант 18

K12.



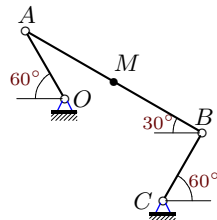
$$\omega_{OA} = 1.5 \frac{1}{c},$$

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

$$OA=38, AB=120, BC=81$$

Вариант 19

K12.



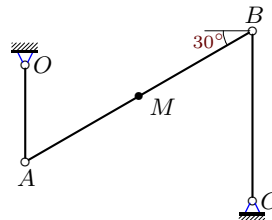
$$\omega_{OA} = 1.1 \frac{1}{c},$$

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

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

Вариант 20

K12.



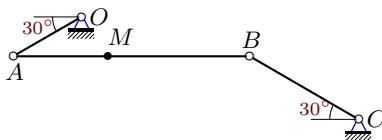
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$AM = 9t(5 - t); t = 2 \text{ c},$$

$$OA=40, AB=108, BC=70$$

Вариант 21

K12.



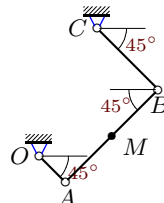
$$\omega_{OA} = 0.7 \frac{1}{c},$$

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

$$OA=50, AB=150, BC=80$$

Вариант 22

K12.



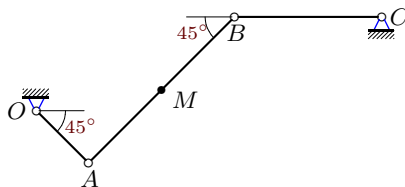
$$\omega_{OA} = 1.6 \frac{1}{c},$$

$$AM = 16t + 8 \sin^2(\pi t/3); t = 3 \text{ c},$$

$$OA=27, AB=96, BC=63$$

Вариант 23

K12.



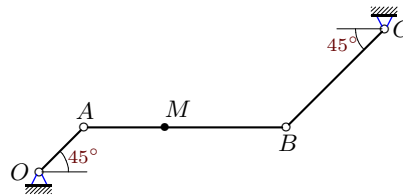
$$\omega_{OA} = 1.7 \frac{1}{c},$$

$$AM = 14t(3 - t); t = 1 \text{ c},$$

$$OA=20, AB=56, BC=40$$

Вариант 24

K12.



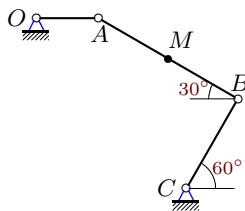
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$AM = 14t + 8 \sin^2(\pi t/4); t = 2 \text{ c},$$

$$OA=28, AB=90, BC=62$$

Вариант 25

K12.



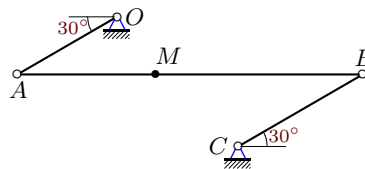
$$\omega_{OA} = 1.1 \frac{1}{c},$$

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

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

Вариант 26

K12.



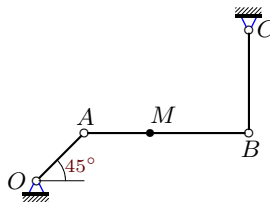
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$AM = 8t(5 - t); t = 2 \text{ c},$$

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

Вариант 27

K12.



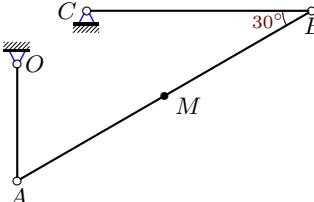
$$\omega_{OA} = 1.8 \frac{1}{c},$$

$$AM = 7t(2 + \cos(\pi t/3)); t = 4 \text{ c},$$

$$OA=43, AB=105, BC=66$$

Вариант 28

K12.



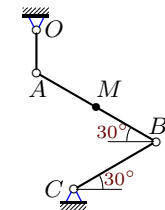
$$\omega_{OA} = 0.5 \frac{1}{c},$$

$$AM = 8(\sin(\pi t/6) + t^2); t = 5 \text{ c},$$

$$OA=140, AB=408, BC=270$$

Вариант 29

K12.



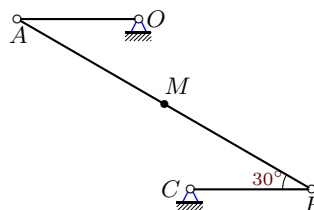
$$\omega_{OA} = 1.6 \frac{1}{c},$$

$$BM = 4t(12 - t); t = 2 \text{ c},$$

$$OA=50, AB=160, BC=110$$

Вариант 30

K12.



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

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

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

Ответы

	ω_e	ε_e	v_r^T	v_e	v	W_r^T	W_e	W_C	W
1	0.00	1.32	20.00	60.00	40.00	17.55	11.04	0.00	20.73
2	-0.00	-0.71	12.00	32.00	39.40	17.55	44.34	0.00	61.89
3	-0.69	-0.83	3.14	12.00	8.86	7.17	55.64	4.35	54.26
4	-0.87	2.80	-20.00	30.00	10.00	10.00	245.88	34.64	272.13
5	0.40	1.29	18.00	115.03	98.54	-36.00	20.11	14.24	58.57
6	-0.43	0.47	10.00	19.84	13.92	17.55	45.39	8.66	32.00
7	-0.36	1.32	19.00	36.66	28.16	-38.00	72.53	13.86	109.58
8	-1.17	2.90	-31.89	22.91	8.98	-24.22	148.04	74.95	224.00
9	1.10	8.23	-11.63	29.10	23.22	-2.19	129.44	25.58	105.90
10	0.12	-0.15	66.83	54.99	110.91	13.04	35.42	15.56	49.07
11	-0.19	0.36	3.77	18.33	16.12	8.61	26.31	1.45	17.90
12	0.47	-1.38	51.28	82.46	129.15	40.07	140.82	48.34	199.23
13	0.00	-4.44	-31.89	32.40	24.61	-24.22	66.62	0.00	89.56
14	-0.31	1.42	-28.00	93.67	120.83	14.00	17.42	17.32	6.25
15	-0.00	0.19	3.14	26.40	23.26	7.17	23.46	0.00	24.53
16	0.30	0.62	42.00	169.58	133.34	-92.12	179.32	25.28	83.91
17	0.42	0.37	90.00	48.15	47.21	25.89	37.03	75.66	113.12
18	-0.34	0.67	20.00	47.00	31.58	-9.87	71.68	13.44	86.46
19	0.37	0.12	4.08	21.83	18.93	9.32	29.53	2.99	37.08
20	0.00	-0.97	9.00	48.00	55.98	-18.00	28.90	0.00	11.06
21	0.40	-0.32	36.00	18.52	53.84	10.36	13.48	29.10	30.90
22	0.00	-0.41	16.00	43.20	59.20	17.55	49.37	0.00	52.40
23	0.61	-2.86	14.00	38.01	50.92	-28.00	24.57	17.00	38.69
24	-0.00	1.44	14.00	42.00	33.59	-9.87	45.12	0.00	54.89
25	-0.37	0.16	4.08	21.83	18.93	9.32	38.52	2.99	31.09
26	0.00	-1.73	8.00	48.00	52.46	-16.00	73.62	0.00	63.87
27	-0.52	1.37	35.89	63.83	37.86	28.05	117.31	37.42	113.34
28	0.34	0.06	76.37	70.00	141.39	14.90	43.64	52.41	95.93
29	-0.50	-0.74	-32.00	69.28	37.28	8.00	98.72	32.00	113.17
30	0.00	-9.66	-15.63	26.00	22.67	-2.19	117.09	0.00	116.01