

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
К12.

$\omega_{OA} = 0.7 \frac{1}{c}$,
 $AM = 15(\sin(\pi t/6) + t^2)$; $t = 3$ с,
 $OA=134$, $AB=375$, $BC=194$

Вариант 2
К12.

$\omega_{OA} = 1.3 \frac{1}{c}$,
 $AM = 12t(2 + \cos(\pi t/3))$; $t = 6$ с,
 $OA=140$, $AB=432$, $BC=290$

Вариант 3
К12.

$\omega_{OA} = 1.1 \frac{1}{c}$,
 $BM = 14t(2 + \cos(\pi t/3))$; $t = 2$ с,
 $OA=30$, $AB=84$, $BC=40$

Вариант 4
К12.

$\omega_{OA} = 1.5 \frac{1}{c}$,
 $AM = 18t + 8 \sin^2(\pi t/3)$; $t = 3$ с,
 $OA=36$, $AB=108$, $BC=74$

Вариант 5
К12.

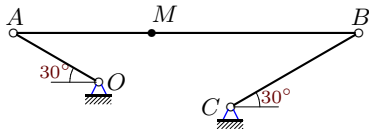
$\omega_{OA} = 1.9 \frac{1}{c}$,
 $AM = 7t(2 + \cos(\pi t/3))$; $t = 4$ с,
 $OA=40$, $AB=105$, $BC=70$

Вариант 6
К12.

$\omega_{OA} = 2.1 \frac{1}{c}$,
 $AM = 12t(2 + \cos(\pi t/3))$; $t = 4$ с,
 $OA=56$, $AB=180$, $BC=121$

Вариант 7

K12.



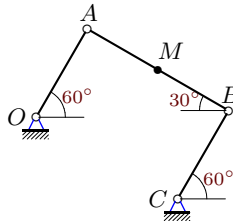
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$AM = 10t + 8 \sin^2(\pi t/4); t = 2 \text{ c},$$

$$OA=20, AB=70, BC=30$$

Вариант 8

K12.



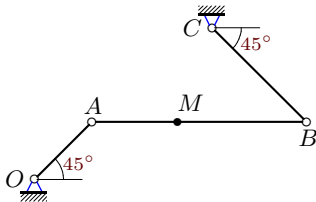
$$\omega_{OA} = 2 \frac{1}{c},$$

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

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

Вариант 9

K12.



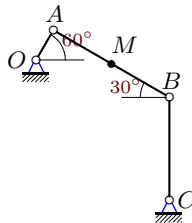
$$\omega_{OA} = 1.5 \frac{1}{c},$$

$$AM = 28t(3 - t); t = 1 \text{ c},$$

$$OA=53, AB=140, BC=87$$

Вариант 10

K12.



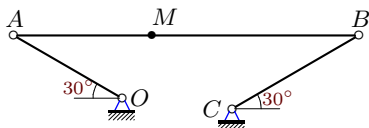
$$\omega_{OA} = 3.2 \frac{1}{c},$$

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

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

Вариант 11

K12.



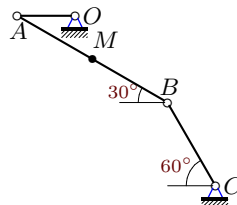
$$\omega_{OA} = 1.9 \frac{1}{c},$$

$$AM = 11t(2 + \cos(\pi t/3)); t = 4 \text{ c},$$

$$OA=60, AB=165, BC=70$$

Вариант 12

K12.



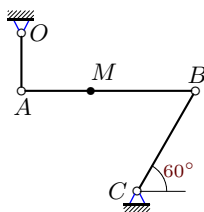
$$\omega_{OA} = 1.2 \frac{1}{c},$$

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

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

Вариант 13

K12.



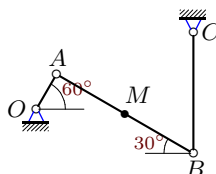
$$\omega_{OA} = 2 \frac{1}{c},$$

$$AM = 12t(2 + \cos(\pi t/3)); t = 4 \text{ c},$$

$$OA=60, AB=180, BC=120$$

Вариант 14

K12.



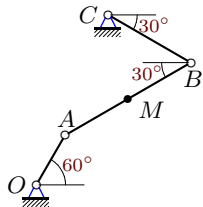
$$\omega_{OA} = 3.2 \frac{1}{c},$$

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

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

Вариант 15

K12.



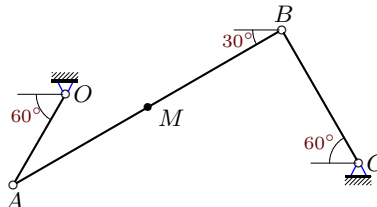
$$\omega_{OA} = 1.6 \frac{1}{c},$$

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

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

Вариант 16

K12.



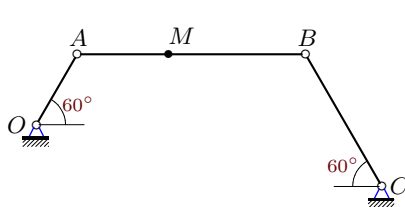
$$\omega_{OA} = 1.2 \frac{1}{c},$$

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

$$OA=170, AB=504, BC=250$$

Вариант 17

K12.



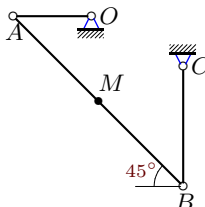
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$AM = 15t(5 - t); t = 2 \text{ c},$$

$$OA=80, AB=225, BC=150$$

Вариант 18

K12.



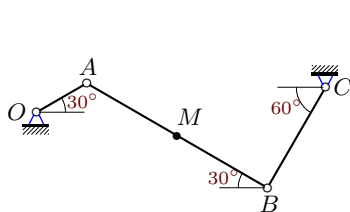
$$\omega_{OA} = 1.4 \frac{1}{c},$$

$$BM = 7t(14 - t); t = 3 \text{ c},$$

$$OA=150, AB=462, BC=230$$

Вариант 19

K12.



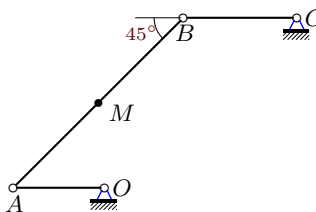
$$\omega_{OA} = 2.9 \frac{1}{c},$$

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

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

Вариант 20

K12.



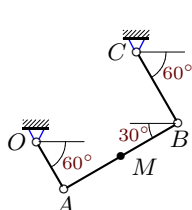
$$\omega_{OA} = 1.4 \frac{1}{c},$$

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

$$OA=41, AB=108, BC=51$$

Вариант 21

K12.



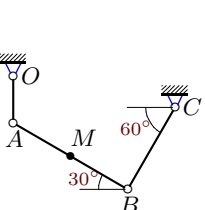
$$\omega_{OA} = 1.6 \frac{1}{c},$$

$$AM = 12t(3 - t); t = 1 \text{ c},$$

$$OA=20, AB=48, BC=30$$

Вариант 22

K12.



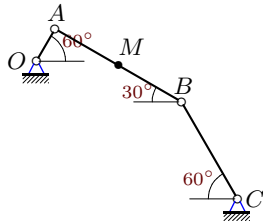
$$\omega_{OA} = 2.6 \frac{1}{c},$$

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

$$OA=10, AB=28, BC=20$$

Вариант 23

K12.



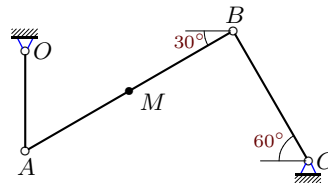
$$\omega_{OA} = 3.2 \frac{1}{c},$$

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

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

Вариант 24

K12.



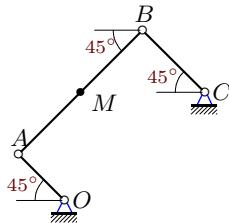
$$\omega_{OA} = 1.4 \frac{1}{c},$$

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

$$OA=20, AB=48, BC=30$$

Вариант 25

K12.



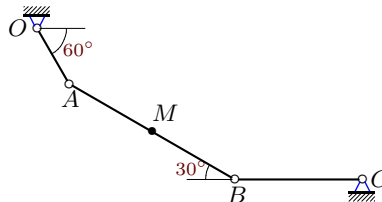
$$\omega_{OA} = 1.5 \frac{1}{c},$$

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

$$OA=40, AB=108, BC=54$$

Вариант 26

K12.



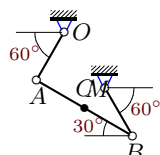
$$\omega_{OA} = 1.5 \frac{1}{c},$$

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

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

Вариант 27

K12.



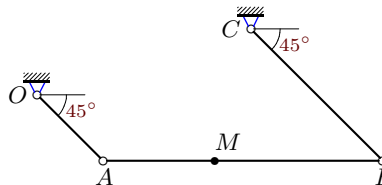
$$\omega_{OA} = 2.2 \frac{1}{c},$$

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

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

Вариант 28

K12.



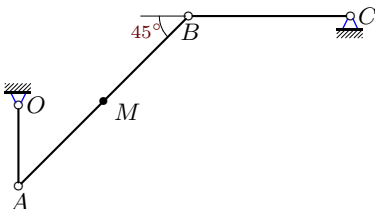
$$\omega_{OA} = 1.2 \frac{1}{c},$$

$$AM = 12t(5 - t); t = 2 \text{ c},$$

$$OA=60, AB=180, BC=120$$

Вариант 29

K12.



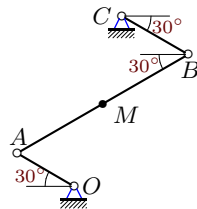
$$\omega_{OA} = 0.6 \frac{1}{c},$$

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

$$OA=120, AB=357, BC=240$$

Вариант 30

K12.



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

$$AM = 10t(2 + \cos(\pi t/3)); t = 6 \text{ c},$$

$$OA=120, AB=360, BC=140$$

Ответы

	ω_e	ε_e	v_r^T	v_e	v	W_r^T	W_e	W_C	W
1	0.00	0.08	90.00	93.80	70.42	25.89	58.11	0.00	80.32
2	-0.42	-2.23	36.00	240.76	265.73	-78.96	287.60	30.33	306.59
3	0.45	-0.28	4.39	19.05	22.96	10.04	23.67	3.99	34.44
4	0.35	-0.71	18.00	42.69	59.34	17.55	53.91	12.73	75.01
5	-0.51	1.37	35.89	62.67	36.85	28.05	121.64	36.74	117.80
6	0.00	-0.74	61.53	117.60	179.13	48.08	193.89	0.00	199.77
7	0.74	-0.55	10.00	15.87	7.21	-9.87	44.51	14.85	26.70
8	0.00	0.00	-9.63	20.00	29.63	-2.19	40.00	0.00	40.06
9	-0.80	0.09	28.00	57.33	30.37	-56.00	144.22	44.97	215.83
10	-0.47	1.06	-31.89	33.31	64.56	-24.22	81.80	30.22	58.88
11	1.20	-1.08	56.40	60.32	19.75	44.08	202.42	135.00	144.26
12	0.69	-0.93	4.71	18.00	22.71	10.76	25.60	6.52	29.85
13	-0.38	-2.27	61.53	123.16	183.63	48.08	77.00	47.37	47.27
14	-0.47	3.84	-31.89	33.31	64.56	-24.22	27.80	30.22	28.73
15	-0.73	-0.07	19.00	27.71	14.73	-38.00	96.01	27.71	142.49
16	0.35	-0.33	42.00	134.93	168.93	-92.12	185.49	29.44	113.07
17	-0.43	-0.12	15.00	83.69	68.81	-30.00	133.40	12.80	161.68
18	0.64	0.17	-56.00	148.49	92.49	14.00	272.31	72.00	216.72
19	-0.40	2.90	-29.44	26.14	55.04	-22.36	49.48	23.72	67.40
20	0.00	0.21	18.00	57.40	46.45	17.55	72.91	0.00	87.28
21	-0.00	-0.36	12.00	32.00	44.00	-24.00	42.67	0.00	48.95
22	-0.46	-1.19	-15.63	23.44	9.47	-2.19	55.81	14.51	68.62
23	-1.42	-7.87	-31.89	42.33	69.65	-24.22	258.96	90.66	177.11
24	0.29	-1.12	8.00	25.24	33.00	17.55	18.97	4.67	37.05
25	-0.00	0.22	18.00	60.00	42.00	17.55	78.33	0.00	80.27
26	-0.87	2.80	-20.00	30.00	10.00	10.00	245.88	34.64	272.13
27	1.91	10.65	-11.63	29.10	21.69	-2.19	159.12	44.31	117.13
28	-0.00	-0.34	12.00	72.00	80.93	-24.00	71.25	0.00	92.65
29	0.29	-0.17	66.83	50.91	117.74	13.04	16.04	38.12	48.54
30	-0.00	1.03	30.00	144.00	118.97	-65.80	93.46	0.00	41.16