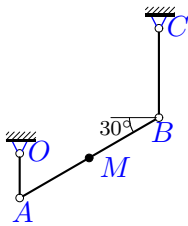


Сложное движение точки, плоское переносное движение

Плоский шарнирно-стержневой механизм приводится в движение кривошипом OA , который вращается против часовой стрелки с постоянной угловой скоростью ω . Вдоль стержня AB 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 сантиметрах. Стержни, положение которых не задано углом, горизонтальны или вертикальны. Найти абсолютную скорость и абсолютное ускорение точки M в этот момент.

Задача K12.1.

10



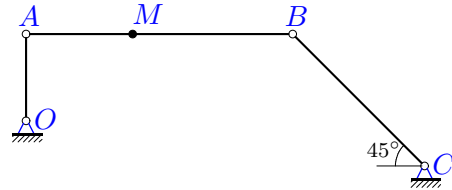
$$AM = 6t + 8 \sin^2(\pi t/3); t = 3 \text{ с},$$

$$\omega_{OA} = 1.6 \frac{1}{\text{с}},$$

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

Задача K12.2.

10



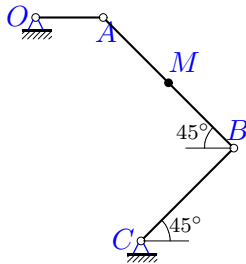
$$AM = 20t + 8 \sin^2(\pi t/4); t = 2 \text{ с},$$

$$\omega_{OA} = 1.5 \frac{1}{\text{с}},$$

$$OA = 39, AB = 120, BC = 84$$

Задача K12.3.

10



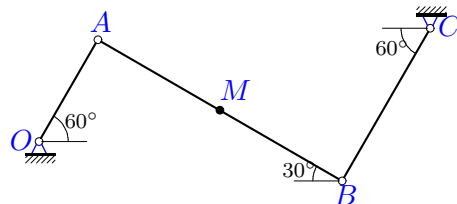
$$BM = 15t(2 + \cos(\pi t/3)); t = 2 \text{ с},$$

$$\omega_{OA} = 1.1 \frac{1}{\text{с}},$$

$$OA = 33, AB = 90, BC = 64$$

Задача K12.4.

10



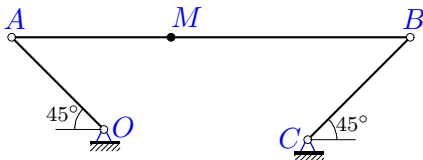
$$BM = 8t(2 + \cos(\pi t/3)); t = 2 \text{ с},$$

$$\omega_{OA} = 1.1 \frac{1}{\text{с}},$$

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

Задача K12.5.

10



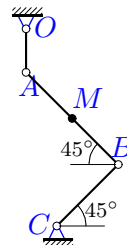
$$AM = 11(\sin(\pi t/6) + t^2); t = 3 \text{ с},$$

$$\omega_{OA} = 0.7 \frac{1}{\text{с}},$$

$$OA = 90, AB = 275, BC = 100$$

Задача K12.6.

10



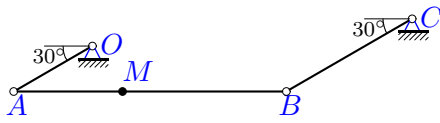
$$BM = 10t(2 + \cos(\pi t/3)); t = 2 \text{ с},$$

$$\omega_{OA} = 1.2 \frac{1}{\text{с}},$$

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

Задача K12.7.

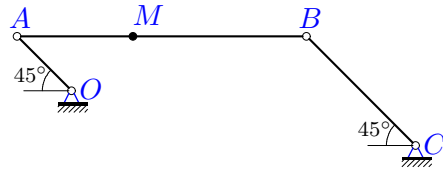
10



$AM = 6(\sin(\pi t/6) + t^2); t = 3 \text{ c},$
 $\omega_{OA} = 0.7 \frac{1}{\text{c}},$
 $OA = 50, AB = 150, BC = 80$

Задача K12.8.

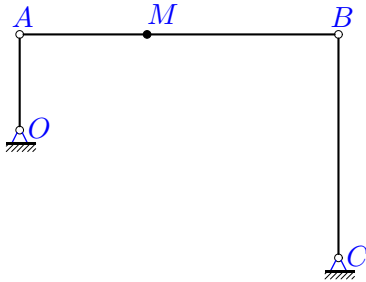
10



$AM = 15(\sin(\pi t/6) + t^2); t = 3 \text{ c},$
 $\omega_{OA} = 0.9 \frac{1}{\text{c}},$
 $OA = 100, AB = 375, BC = 200$

Задача K12.9.

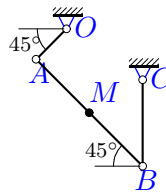
10



$AM = 16t + 8 \sin^2(\pi t/4); t = 2 \text{ c},$
 $\omega_{OA} = 1.5 \frac{1}{\text{c}},$
 $OA = 30, AB = 100, BC = 70$

Задача K12.10.

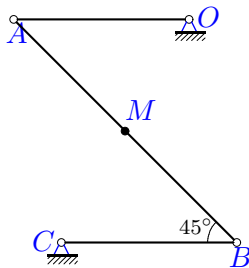
10



$BM = 7(\sin(\pi t/6) + t^2); t = 1 \text{ c},$
 $\omega_{OA} = 2.9 \frac{1}{\text{c}},$
 $OA = 6, AB = 21, BC = 12$

Задача K12.11.

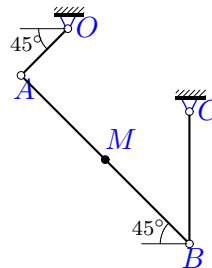
10



$BM = 6(\sin(\pi t/6) + t^2); t = 1 \text{ c},$
 $\omega_{OA} = 1.5 \frac{1}{\text{c}},$
 $OA = 10, AB = 18, BC = 10$

Задача K12.12.

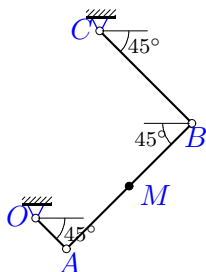
10



$BM = 9t(12 - t); t = 2 \text{ c},$
 $\omega_{OA} = 1.7 \frac{1}{\text{c}},$
 $OA = 100, AB = 360, BC = 200$

Задача K12.13.

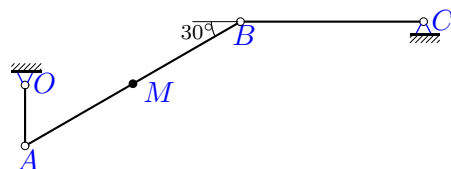
10



$AM = 8(\sin(\pi t/6) + t^2); t = 5 \text{ c},$
 $\omega_{OA} = 0.8 \frac{1}{\text{c}},$
 $OA = 100, AB = 408, BC = 300$

Задача K12.14.

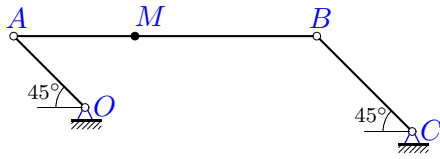
10



$AM = 8(\sin(\pi t/6) + t^2); t = 5 \text{ c},$
 $\omega_{OA} = 0.8 \frac{1}{\text{c}},$
 $OA = 100, AB = 408, BC = 300$

Задача K12.15.

10



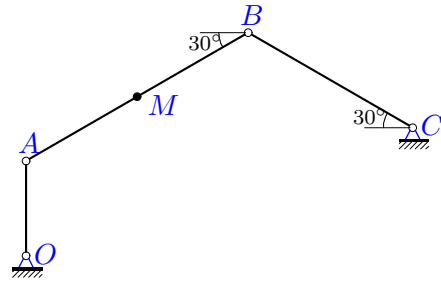
$$AM = 14t + 8 \sin^2(\pi t/4); t = 2 \text{ c,}$$

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

$$OA = 30, AB = 90, BC = 40$$

Задача K12.16.

10



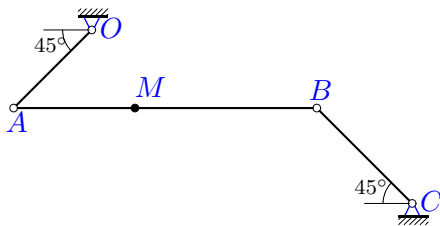
$$AM = 15t(2 + \cos(\pi t/3)); t = 6 \text{ c,}$$

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

$$OA = 200, AB = 540, BC = 400$$

Задача K12.17.

10



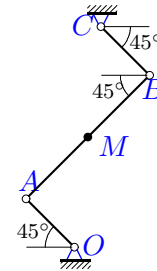
$$AM = 15t(2 + \cos(\pi t/3)); t = 4 \text{ c,}$$

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

$$OA = 82, AB = 225, BC = 100$$

Задача K12.18.

10



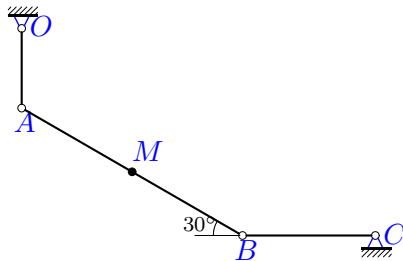
$$AM = 15(\sin(\pi t/6) + t^2); t = 5 \text{ c,}$$

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

$$OA = 300, AB = 765, BC = 300$$

Задача K12.19.

10



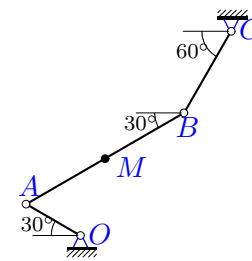
$$BM = 6t(10 - t); t = 2 \text{ c,}$$

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

$$OA = 60, AB = 192, BC = 100$$

Задача K12.20.

10



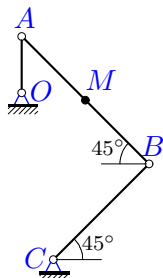
$$AM = 29t(3 - t); t = 1 \text{ c,}$$

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

$$OA = 40, AB = 116, BC = 60$$

Задача K12.21.

10



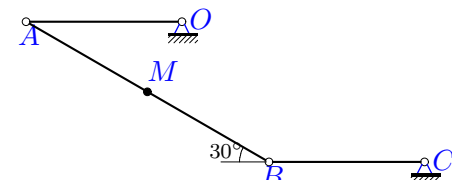
$$BM = 14t + 8 \sin^2(\pi t/6); t = 1 \text{ c,}$$

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

$$OA = 10, AB = 32, BC = 24$$

Задача K12.22.

10



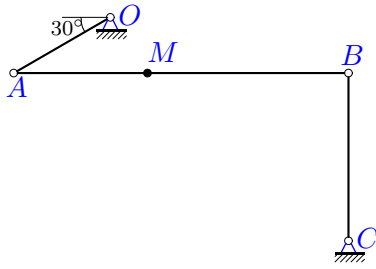
$$BM = 6(\sin(\pi t/6) + t^2); t = 1 \text{ c,}$$

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

$$OA = 10, AB = 18, BC = 10$$

Задача K12.23.

10



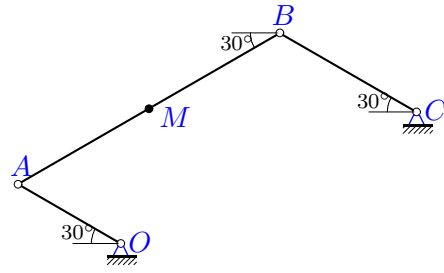
$$AM = 8t(5 - t); t = 2 \text{ с},$$

$$\omega_{OA} = 1.2 \frac{1}{\text{с}},$$

$$OA = 40, AB = 120, BC = 60$$

Задача K12.24.

10



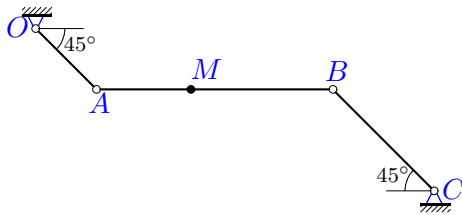
$$AM = 15(\sin(\pi t/6) + t^2); t = 5 \text{ с},$$

$$\omega_{OA} = 0.5 \frac{1}{\text{с}},$$

$$OA = 300, AB = 765, BC = 400$$

Задача K12.25.

10



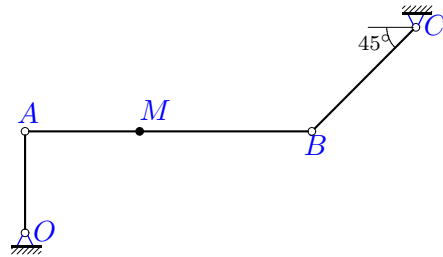
$$AM = 11t(2 + \cos(\pi t/3)); t = 4 \text{ с},$$

$$\omega_{OA} = 1.9 \frac{1}{\text{с}},$$

$$OA = 60, AB = 165, BC = 100$$

Задача K12.26.

10



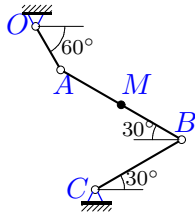
$$AM = 13t(2 + \cos(\pi t/3)); t = 4 \text{ с},$$

$$\omega_{OA} = 2 \frac{1}{\text{с}},$$

$$OA = 69, AB = 195, BC = 100$$

Задача K12.27.

10



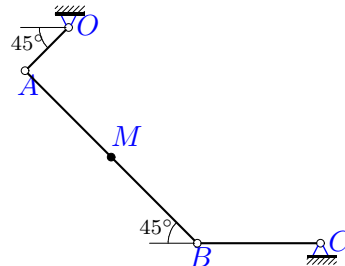
$$BM = 12t + 8 \sin^2(\pi t/6); t = 1 \text{ с},$$

$$\omega_{OA} = 2.6 \frac{1}{\text{с}},$$

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

Задача K12.28.

10



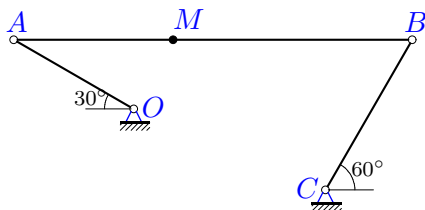
$$BM = 6t(14 - t); t = 3 \text{ с},$$

$$\omega_{OA} = 1.5 \frac{1}{\text{с}},$$

$$OA = 100, AB = 396, BC = 200$$

Задача K12.29.

10



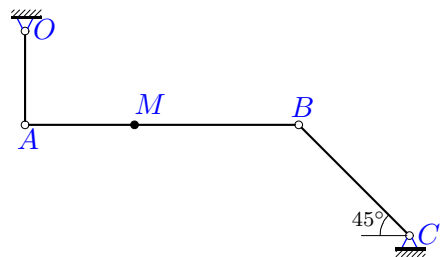
$$AM = 23t(3 - t); t = 1 \text{ с},$$

$$\omega_{OA} = 1.6 \frac{1}{\text{с}},$$

$$OA = 40, AB = 115, BC = 50$$

Задача K12.30.

10



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

$$\omega_{OA} = 0.7 \frac{1}{\text{с}},$$

$$OA = 60, AB = 175, BC = 100$$

К12 Ответы.**Сложное движение точки, плоское переносное движение**

07.04.2012

№	ω_e	ε_e	v_r^T	v_{xe}	v_{ye}	v_e	v	a_r^T	a_e	a_C	a
1	-0.000	-0.411	6.00	16.00	-0.00	16.000	21.407	17.546	19.55	0.00	33.754
2	-0.487	-0.467	20.00	-58.50	-23.40	63.006	45.053	-9.870	110.74	19.50	131.385
3	-0.285	0.199	4.71	-9.07	27.22	28.698	24.578	10.758	37.26	2.68	30.472
4	0.000	0.840	2.51	-19.05	11.00	22.000	19.490	5.737	4.03	0.00	7.013
5	0.324	-0.099	66.00	-44.55	-8.91	45.430	23.229	18.984	46.44	42.77	38.627
6	-0.283	-0.459	3.14	18.00	-6.00	18.974	21.826	7.172	23.70	1.78	16.317
7	-0.000	-0.122	36.00	17.50	-30.31	35.000	61.490	10.355	21.78	0.00	31.951
8	-0.000	0.153	90.00	-63.64	-63.64	90.000	68.883	25.888	66.79	0.00	89.984
9	-0.000	0.386	16.00	-45.00	0.00	45.000	29.000	-9.870	52.07	0.00	52.999
10	0.829	0.309	-17.17	18.46	-6.15	19.454	8.703	-13.040	54.18	28.46	32.360
11	-0.000	-3.536	-14.72	-0.00	-15.00	15.000	11.377	-11.178	22.50	0.00	16.599
12	0.472	0.353	-72.00	180.31	-60.10	190.066	129.727	18.000	354.76	68.00	285.344
13	-0.000	-0.105	76.37	56.57	56.57	80.000	156.372	14.903	42.67	0.00	45.195
14	0.392	-0.580	76.37	40.00	69.28	80.000	151.047	14.903	62.92	59.90	15.820
15	-0.000	0.265	14.00	-31.82	-31.82	45.000	36.470	-9.870	61.12	0.00	53.772
16	-0.444	-0.114	45.00	-180.00	-103.92	207.846	162.846	-98.696	342.72	40.00	436.080
17	0.979	-2.485	76.91	110.17	-22.03	112.349	188.374	60.106	123.84	150.64	228.297
18	-0.000	0.196	143.20	-106.07	-106.07	150.000	6.802	27.944	0.00	0.00	27.944
19	-1.000	4.612	-36.00	48.00	-83.14	96.000	67.276	12.000	601.15	72.00	667.438
20	1.172	6.367	29.00	-68.00	0.00	68.000	45.270	-58.000	270.07	68.00	346.517
21	0.619	1.222	-17.63	-21.00	7.00	22.136	38.714	-2.193	60.99	21.81	74.494
22	0.000	0.000	-14.72	0.00	-15.00	15.000	14.862	-11.178	22.50	0.00	13.985
23	0.346	-0.320	8.00	24.00	-24.94	34.613	40.572	-16.000	46.12	5.54	33.930
24	0.000	0.028	143.20	-75.00	-129.90	150.000	76.169	27.944	65.85	0.00	84.927
25	0.000	-2.970	56.40	80.61	80.61	114.000	158.968	44.077	159.05	0.00	117.209
26	0.708	4.678	66.66	-138.00	55.20	148.631	90.203	52.092	97.13	94.35	183.733
27	-1.072	0.199	-15.63	15.01	0.00	15.011	7.952	-2.193	83.12	33.51	104.006
28	-0.379	0.379	-48.00	53.03	-159.10	167.705	126.606	12.000	301.35	36.36	336.772
29	0.643	-0.036	23.00	-32.00	-25.87	41.146	27.386	-46.000	87.46	29.56	33.214
30	0.240	-0.511	42.00	42.00	16.80	45.235	85.664	12.081	7.52	20.16	15.985

К12 файл o12k10A

N_0	a_{xr}	a_{yr}	a_{xe}	a_{ye}	a_x	a_y
1	15.195	8.773	3.695	19.200	18.890	27.973
2	-9.870	0.000	-11.408	-110.151	-21.277	-129.651
3	7.607	-7.607	-36.175	8.931	-30.467	-0.574
4	4.969	-2.869	-2.017	-3.493	2.952	-6.362
5	18.984	0.000	19.637	-42.089	38.622	0.677
6	5.071	-5.071	-11.443	20.751	-7.627	14.425
7	10.355	0.000	21.218	4.900	31.573	4.900
8	25.888	0.000	57.276	-34.365	83.163	-34.365
9	-9.870	0.000	-0.000	-52.071	-9.870	-52.071
10	-9.221	9.221	32.876	43.070	3.531	32.167
11	-7.904	7.904	-0.000	-22.500	-7.904	-14.596
12	12.728	-12.728	220.862	277.627	185.506	216.815
13	10.538	10.538	-30.170	30.170	-19.632	40.708
14	12.907	7.452	32.000	-54.171	14.957	5.156
15	-9.870	0.000	47.730	-38.184	37.860	-38.184
16	-85.473	-49.348	-30.792	-341.333	-96.265	-425.322
17	60.106	0.000	123.011	-14.301	183.117	136.337
18	19.759	19.759	-0.000	0.000	19.759	19.759
19	10.392	-6.000	138.240	585.039	184.632	641.393
20	-50.229	-29.000	-153.574	222.149	-237.803	252.039
21	-1.551	1.551	9.494	-60.244	-7.481	-74.117
22	-9.680	5.589	22.500	0.000	12.820	5.589
23	-16.000	0.000	44.123	13.440	28.123	18.983
24	24.200	13.972	59.539	-28.125	83.739	-14.153
25	44.077	0.000	-153.159	-42.885	-109.082	-42.885
26	52.092	0.000	-39.065	88.923	13.027	183.271
27	-1.899	1.097	-46.345	69.005	-31.488	99.125
28	8.485	-8.485	192.050	232.226	226.248	249.454
29	-46.000	0.000	69.685	-52.845	23.685	-23.285
30	12.081	0.000	-4.032	-6.349	8.049	13.811