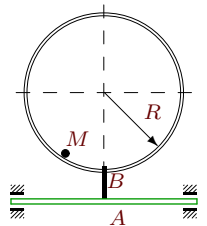
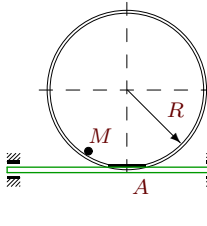
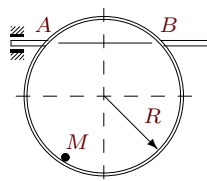
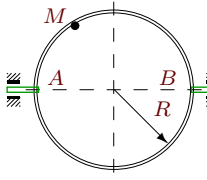
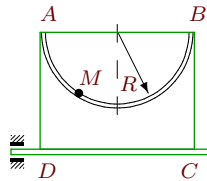
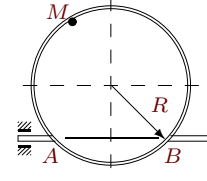
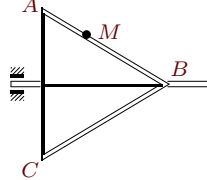
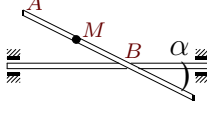
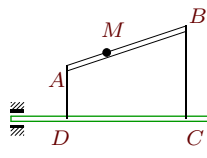
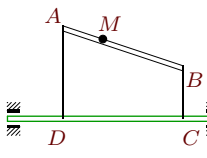


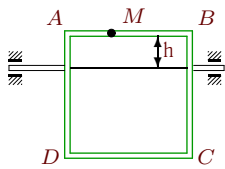
Сложное движение точки, пространственная траектория

Геометрическая фигура вращается вокруг оси, лежащей в ее плоскости. По каналу, расположенному на фигуре, движется точка M по известному закону $AM(t)$ или $BM(t)$ (в см). Найти абсолютную скорость и абсолютное ускорение точки при $t = t_1$. Даны закон вращения фигуры $\varphi_e(t)$ (или постоянная угловая скорость ω_e), время t_1 и размеры фигуры. Углы даны в рад, размеры — в см. Длина BM или AM — длина отрезка прямой или дуги окружности, AB — длина отрезка прямой.

Кирсанов М.Н. **Решebник. Теоретическая механика**/Под ред. А. И. Кириллова.— М.:ФИЗМАТЛИТ, 2002.— 384 с. (с.202.)

<p>Задача 11.1</p>  <p> $\omega_e = 0.05 \text{ рад/с,}$ $BM = \frac{\pi}{4}(t^2 + 52),$ $R = 61,$ $AB = 30,$ $t = 3 \text{ с.}$ </p>	<p>Задача 11.2</p>  <p> $\omega_e = 0.03 \text{ рад/с,}$ $AM = \frac{2\pi}{3}(t^2 + 50),$ $R = 51,$ $t = 1 \text{ с.}$ </p>
<p>Задача 11.3</p>  <p> $\omega_e = 0.06 \text{ рад/с,}$ $AM = \frac{\pi}{3}(t^2 + 52),$ $R = 61,$ $AB = 61,$ $t = 3 \text{ с.}$ </p>	<p>Задача 11.4</p>  <p> $\omega_e = 0.12 \text{ рад/с,}$ $AM = \frac{2\pi}{3}(t^2 + 52),$ $R = 61,$ $t = 3 \text{ с.}$ </p>
<p>Задача 11.5</p>  <p> $\omega_e = 0.5 \text{ рад/с,}$ $AM = \frac{5\pi}{6}(t^2 + 52),$ $R = 61,$ $AD = 62,$ $t = 3 \text{ с.}$ </p>	<p>Задача 11.6</p>  <p> $\omega_e = 0.63 \text{ рад/с,}$ $AM = \frac{3\pi}{2}(t^2 + 52),$ $R = 61,$ $AB = 61,$ $t = 3 \text{ с.}$ </p>
<p>Задача 11.7</p>  <p> $\varphi_e = 0.01t^2,$ $AM = \frac{3}{4}(t^2 + 52),$ $AB=BC=AC=122,$ $t = 3 \text{ с.}$ </p>	<p>Задача 11.8</p>  <p> $\varphi_e = 0t^2,$ $AM = \frac{1}{3}(t^2 + 51),$ $AB = 110,$ $\alpha = \pi/4,$ $t = 2 \text{ с.}$ </p>
<p>Задача 11.9</p>  <p> $\varphi_e = 0.01t^2,$ $AM = \frac{1}{4}(t^2 + 50),$ $AD = 14,$ $BC = 29,$ $DC = 44,$ $t = 1 \text{ с.}$ </p>	<p>Задача 11.10</p>  <p> $\varphi_e = 0.01t^2,$ $AM = \frac{1}{4}(t^2 + 51),$ $AD = 31,$ $BC = 15,$ $DC = 48,$ $t = 2 \text{ с.}$ </p>

Задача 11.11



$$\varphi_e = 1t^2,$$

$$AM = \frac{2}{3}(t^2 + 51),$$

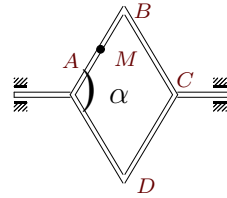
$$AB = 28,$$

$$BC = 28,$$

$$h = 9,$$

$$t = 2 \text{ с.}$$

Задача 11.12



$$\varphi_e = 0.01t^2,$$

$$BM = \frac{5}{6}(t^2 + 50),$$

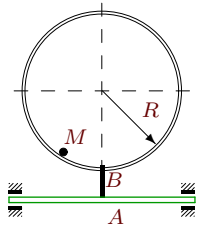
Ромб ABCD.

$$AB = 76,$$

$$\alpha = 2\pi/3,$$

$$t = 1 \text{ с.}$$

Задача 11.13



$$\omega_e = 0.9 \text{ рад/с,}$$

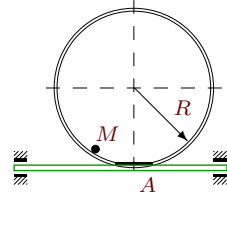
$$BM = \frac{\pi}{3}(t^3 + 2),$$

$$R = 3,$$

$$AB = 2,$$

$$t = 1 \text{ с.}$$

Задача 11.14



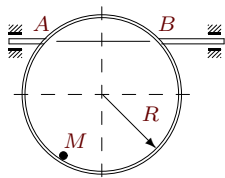
$$\omega_e = 2.09 \text{ рад/с,}$$

$$AM = \frac{\pi}{3}(t^3 + 2),$$

$$R = 3,$$

$$t = 1 \text{ с.}$$

Задача 11.15



$$\omega_e = 0.6 \text{ рад/с,}$$

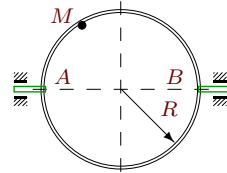
$$AM = \frac{\pi}{3}(t^3 + 2),$$

$$R = 3,$$

$$AB = 3,$$

$$t = 1 \text{ с.}$$

Задача 11.16



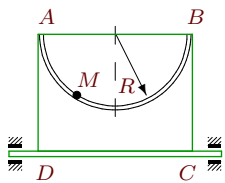
$$\omega_e = 1.71 \text{ рад/с,}$$

$$AM = \frac{\pi}{2}(t^3 + 3),$$

$$R = 11,$$

$$t = 2 \text{ с.}$$

Задача 11.17



$$\omega_e = 1.88 \text{ рад/с,}$$

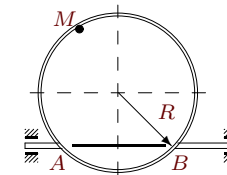
$$AM = \frac{3\pi}{4}(t^3 + 2),$$

$$R = 3,$$

$$AD = 4,$$

$$t = 1 \text{ с.}$$

Задача 11.18



$$\omega_e = 0.56 \text{ рад/с,}$$

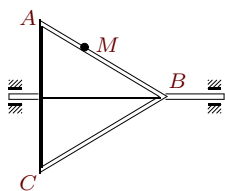
$$AM = \frac{\pi}{4}(t^3 + 4),$$

$$R = 31,$$

$$AB = 31,$$

$$t = 3 \text{ с.}$$

Задача 11.19



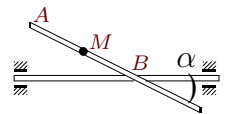
$$\varphi_e = 0.1t^2,$$

$$AM = \frac{5}{6}(t^3 + 4),$$

$$AB=BC=AC=62,$$

$$t = 3 \text{ с.}$$

Задача 11.20



$$\varphi_e = 0.28t^2,$$

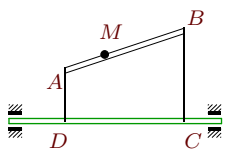
$$AM = \frac{5}{6}(t^3 + 3),$$

$$AB = 22,$$

$$\alpha = \pi/4,$$

$$t = 2 \text{ с.}$$

Задача 11.21



$$\varphi_e = 0.07t^2,$$

$$AM = \frac{1}{4}(t^3 + 2),$$

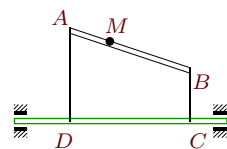
$$AD = 2,$$

$$BC = 5,$$

$$DC = 3,$$

$$t = 1 \text{ с.}$$

Задача 11.22



$$\varphi_e = 0.11t^2,$$

$$AM = \frac{1}{2}(t^3 + 3),$$

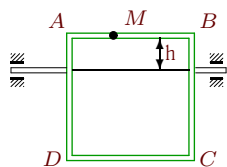
$$AD = 9,$$

$$BC = 4,$$

$$DC = 10,$$

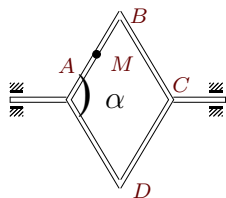
$$t = 2 \text{ с.}$$

Задача 11.23



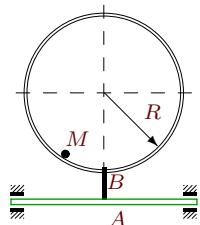
$\varphi_e = 0.07t^2,$
 $AM = \frac{1}{6}(t^3 + 4),$
 $AB = 16,$
 $BC = 16,$
 $h = 5,$
 $t = 3 \text{ с.}$

Задача 11.24



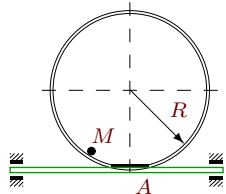
$\varphi_e = 0.11t^2,$
 $BM = \frac{5}{6}(t^3 + 4),$
 Ромб $ABCD.$
 $AB = 46,$
 $\alpha = 2\pi/3,$
 $t = 3 \text{ с.}$

Задача 11.25



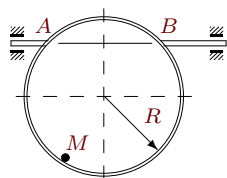
$\omega_e = 0.12 \text{ рад/с},$
 $BM = \frac{3\pi}{2}(t^2 + 50),$
 $R = 51,$
 $AB = 26,$
 $t = 1 \text{ с.}$

Задача 11.26



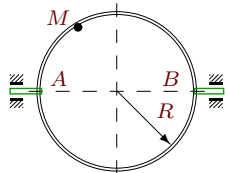
$\omega_e = 0.46 \text{ рад/с},$
 $AM = \frac{3\pi}{4}(t^2 + 4t),$
 $R = 12,$
 $t = 2 \text{ с.}$

Задача 11.27



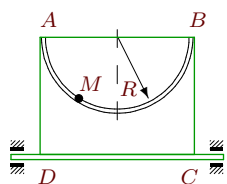
$\omega_e = 0.51 \text{ рад/с},$
 $AM = \frac{\pi}{4}(t^2 + 4)t,$
 $R = 39,$
 $AB = 39,$
 $t = 3 \text{ с.}$

Задача 11.28



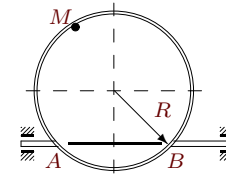
$\omega_e = 0.4 \text{ рад/с},$
 $AM = \frac{\pi}{3}(t^2 + 4t),$
 $R = 12,$
 $t = 2 \text{ с.}$

Задача 11.29



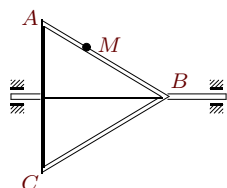
$\omega_e = 0.5 \text{ рад/с},$
 $AM = \frac{5\pi}{6}(t^2 + 52),$
 $R = 61,$
 $AD = 62,$
 $t = 3 \text{ с.}$

Задача 11.30



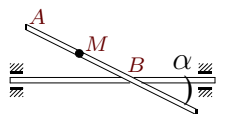
$\omega_e = 0.47 \text{ рад/с},$
 $AM = \frac{3\pi}{2}(t^2 + 51),$
 $R = 55,$
 $AB = 55,$
 $t = 2 \text{ с.}$

Задача 11.31



$\varphi_e = 0.01t^2,$
 $AM = \frac{1}{3}(t^2 + 50),$
 $AB=BC=AC=102,$
 $t = 1 \text{ с.}$

Задача 11.32



$\varphi_e = 0.09t^2,$
 $AM = \frac{2}{3}(t^2 + 4)t,$
 $AB = 78,$
 $\alpha = \pi/4,$
 $t = 3 \text{ с.}$

Сложное движение точки, пространственная траектория

№	R_e	v_r	v_e	v	ω_e	ε_e
1	47.866	4.712	-2.393	5.285	0.050	0.000
2	76.500	4.189	-2.295	4.776	0.030	0.000
3	52.828	6.283	3.170	7.037	0.060	0.000
4	52.828	12.566	-6.339	14.075	0.120	0.000
5	31.500	15.708	15.750	22.244	0.500	0.000
6	22.328	28.274	-14.066	31.580	0.630	0.000
7	38.125	4.500	-2.288	5.048	0.060	0.020
8	64.818	1.333	0.000	1.333	0.000	0.000
9	18.114	0.500	0.362	0.617	0.020	0.020
10	26.652	1.000	1.066	1.462	0.040	0.020
11	0.333	2.667	-1.333	2.981	4.000	2.000
12	29.012	1.667	-0.580	1.765	0.020	0.020
13	3.500	3.142	3.150	4.449	0.900	0.000
14	1.500	3.142	3.135	4.438	2.090	0.000
15	2.598	3.142	1.559	3.507	0.600	0.000
16	11.000	18.850	18.810	26.629	1.710	0.000
17	1.879	7.069	-3.532	7.902	1.880	0.000
18	18.823	21.206	-10.541	23.681	0.560	0.000
19	18.083	22.500	-10.850	24.979	0.600	0.200
20	9.075	10.000	10.163	14.258	1.120	0.560
21	2.530	0.750	-0.354	0.829	0.140	0.140
22	6.540	6.000	-2.878	6.654	0.440	0.220
23	5.000	4.500	-2.100	4.966	0.420	0.140
24	17.465	22.500	-11.527	25.281	0.660	0.220
25	77.000	9.425	9.240	13.199	0.120	0.000
26	20.485	18.850	-9.423	21.074	0.460	0.000
27	23.681	24.347	12.077	27.178	0.510	0.000
28	10.392	8.378	-4.157	9.352	0.400	0.000
29	31.500	15.708	15.750	22.244	0.500	0.000
30	20.131	18.850	-9.462	21.091	0.470	0.000
31	42.500	0.667	0.850	1.080	0.020	0.020
32	36.770	20.667	19.856	28.659	0.540	0.180

№	a_r^n	a_r^τ	a_e^n	a_e^τ	a_c	a_x	a_y	a
1	0.364	1.571	0.120	0.000	0.333	1.248	-0.333	1.548
2	0.344	4.189	0.069	0.000	0.218	3.387	-0.218	4.152
3	0.647	2.094	-0.190	0.000	0.754	-1.904	0.754	2.148
4	2.589	4.189	0.761	0.000	1.508	-5.097	1.508	5.805
5	4.045	5.236	7.875	0.000	13.603	-1.318	13.603	13.696
6	13.106	9.425	8.862	0.000	30.853	-10.471	30.853	36.325
7	0.000	1.500	0.137	-0.763	0.270	-0.887	-0.493	1.648
8	0.000	0.667	0.000	0.000	0.000	-0.471	0.000	0.667
9	0.000	0.500	0.007	0.362	0.006	0.154	0.369	0.619
10	0.000	0.500	0.043	0.533	0.025	-0.201	0.508	0.723
11	0.000	1.333	5.333	-0.667	21.333	-6.667	20.667	21.715
12	0.000	1.667	0.012	-0.580	0.058	-1.455	-0.523	1.756
13	3.290	6.283	2.835	0.000	4.897	4.251	4.897	6.492
14	3.290	6.283	6.552	0.000	11.373	0.534	11.373	11.389
15	3.290	6.283	-0.935	0.000	3.770	-5.348	3.770	7.324
16	32.301	18.850	32.165	0.000	0.000	-64.466	0.000	67.165
17	16.655	14.137	6.640	0.000	18.793	15.133	-18.793	24.195
18	14.506	14.137	5.903	0.000	22.941	11.507	-22.941	27.675
19	0.000	15.000	6.510	-3.617	13.500	-14.010	9.883	21.511
20	0.000	10.000	11.383	5.082	15.839	-18.454	-10.757	22.501
21	0.000	1.500	0.050	-0.354	0.148	1.011	-0.503	1.549
22	0.000	6.000	1.266	-1.439	2.361	-3.949	0.922	6.727
23	0.000	3.000	0.882	-0.700	0.000	-0.882	-0.700	3.204
24	0.000	15.000	7.608	-3.842	25.721	-20.598	21.879	30.971
25	1.742	9.425	1.109	0.000	2.262	-10.534	-2.262	10.914
26	29.609	4.712	4.335	0.000	12.262	-21.939	-12.262	34.938
27	15.200	14.137	-6.159	0.000	23.988	-11.430	23.988	28.768
28	5.849	2.094	1.663	0.000	3.351	-5.681	-3.351	8.121
29	4.045	5.236	7.875	0.000	13.603	-1.318	13.603	13.696
30	6.460	9.425	4.447	0.000	15.345	-9.379	15.345	20.728
31	0.000	0.667	0.017	0.850	0.013	-0.350	0.837	1.075
32	0.000	12.000	10.722	6.619	15.783	-19.207	-9.164	22.911