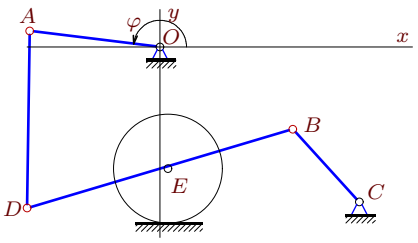
Кинематический анализ плоского механизма (2)

Механизм изображен в произвольном положении, определяемом некоторым углом φ. Задана угловая скорость одного из звеньев или скорость центра диска. Длины звеньев даны в сантиметрах, радиус диска равен 5 см. Заданы координаты шарнира C и ордината оси диска в осях с началом в шарнире O. Диск катится без проскальзывания. Найти угловые скорости всех звеньев механизма и скорость центра диска (если она не задана) при $\varphi = \varphi_0$.

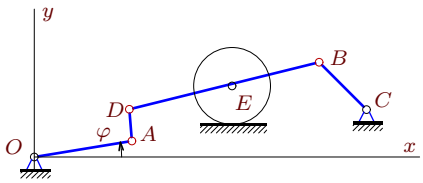
Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.158.)

Задача 27.1. 3



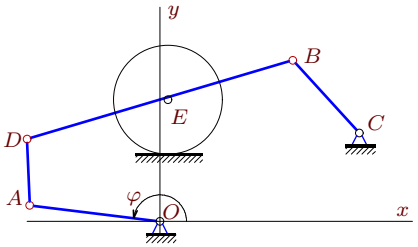
$\omega_{BC_z} = 16$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 16$, $x_C = 18$, $y_C = -14$, $y_E = -11$, $\varphi_0 = \pi$.

Задача 27.2. 3



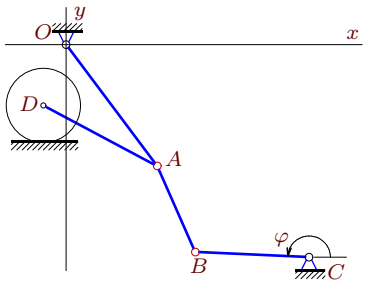
$v_{Ex} = -42$ см/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 4$, $x_C = 42$, $y_C = 6$, $y_E = 9$, $\varphi_0 = 0$.

Задача 27.3. 3



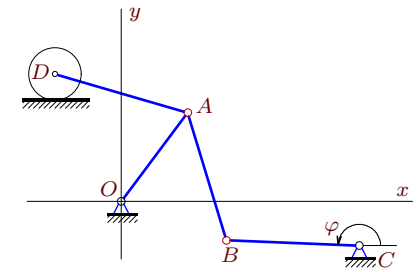
$\omega_{OA_z} = -3$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 6$, $x_C = 18$, $y_C = 8$, $y_E = 11$, $\varphi_0 = \pi$.

Задача 27.4. 3



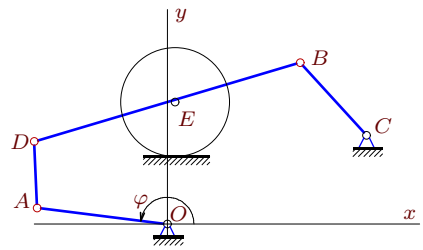
$\omega_{BC_z} = 16$ рад/с, $OA = 20$, $AB = 13$, $BC = 15$, $AD = 17$, $x_C = 32$, $y_C = -28$, $y_D = -8$, $\varphi_0 = \pi$.

Задача 27.5. 3



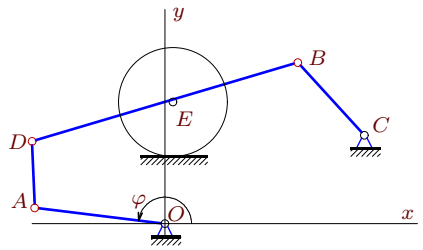
$\omega_{OA_z} = -36$ рад/с, $OA = 20$, $AB = 25$, $BC = 24$, $AD = 25$, $x_C = 43$, $y_C = -8$, $y_D = 23$, $\varphi_0 = \pi$.

Задача 27.6. 3



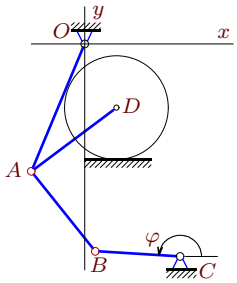
$\omega_{OA_z} = -3$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 6$, $x_C = 18$, $y_C = 8$, $y_E = 11$, $\varphi_0 = \pi$.

Задача 27.7.



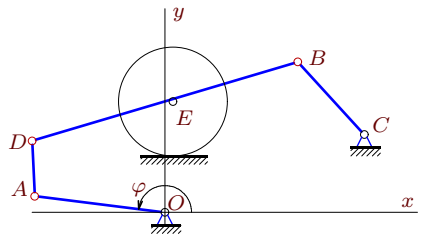
$\omega_{OA_z} = -3$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 6$, $x_C = 18$, $y_C = 8$, $y_E = 11$, $\varphi_0 = \pi$.

Задача 27.8.



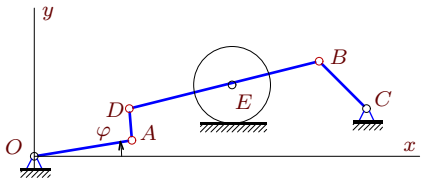
$\omega_{BC_z} = 14$ рад/с, $OA = 13$, $AB = 10$, $BC = 8$, $AD = 10$, $x_C = 9$, $y_C = -20$, $y_D = -6$, $\varphi_0 = \pi$.

Задача 27.9.



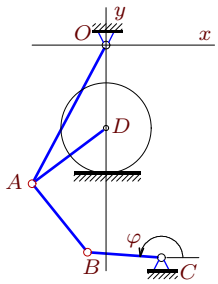
$\omega_{OA_z} = -5$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 5$, $x_C = 18$, $y_C = 7$, $y_E = 10$, $\varphi_0 = \pi$.

Задача 27.10.



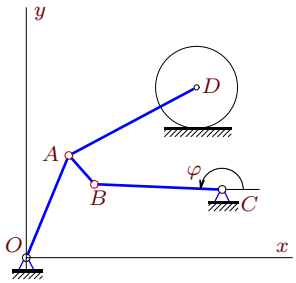
$\omega_{OA_z} = 2$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 4$, $x_C = 42$, $y_C = 6$, $y_E = 9$, $\varphi_0 = 0$.

Задача 27.11.



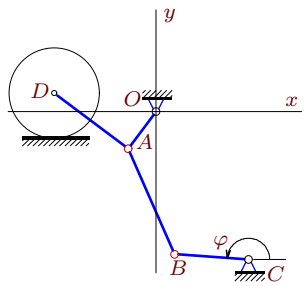
$\omega_{OA_z} = 32$ рад/с, $OA = 17$, $AB = 10$, $BC = 8$, $AD = 10$, $x_C = 6$, $y_C = -23$, $y_D = -9$, $\varphi_0 = \pi$.

Задача 27.12.



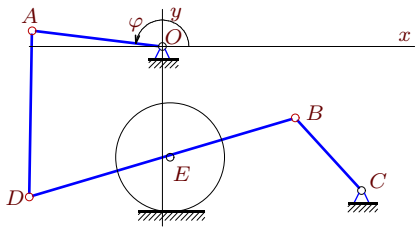
$\omega_{BC_z} = -14$ рад/с, $OA = 13$, $AB = 5$, $BC = 15$, $AD = 17$, $x_C = 23$, $y_C = 8$, $y_D = 20$, $\varphi_0 = \pi$.

Задача 27.13.



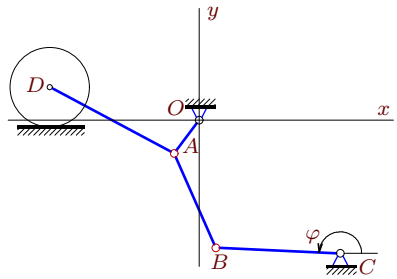
$\omega_{OA_z} = -24$ рад/с, $OA = 5$, $AB = 13$, $BC = 8$, $AD = 10$, $x_C = 10$, $y_C = -16$, $y_D = 2$, $\varphi_0 = \pi$.

Задача 27.14.



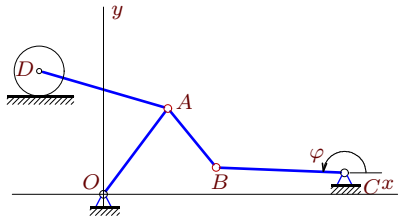
$\omega_{BC_z} = 30$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 15$, $x_C = 18$, $y_C = -13$, $y_E = -10$, $\varphi_0 = \pi$.

Задача 27.15.



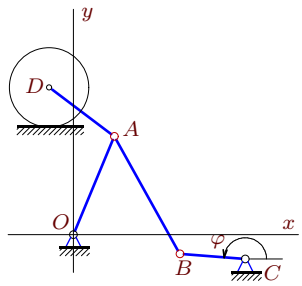
$\omega_{BC_z} = -14$ рад/с, $OA = 5$, $AB = 13$, $BC = 15$, $AD = 17$, $x_C = 17$, $y_C = -16$, $y_D = 4$, $\varphi_0 = \pi$.

Задача 27.16.



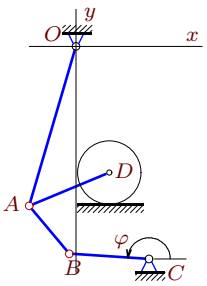
$\omega_{OA_z} = -6$ рад/с, $OA = 20$, $AB = 15$, $BC = 24$, $AD = 25$, $x_C = 45$, $y_C = 4$, $y_D = 23$, $\varphi_0 = \pi$.

Задача 27.17.



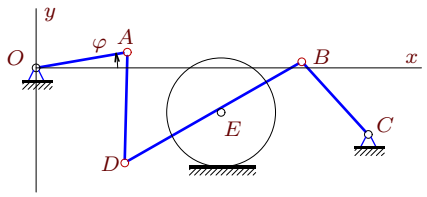
$\omega_{BC_z} = 57$ рад/с, $OA = 13$, $AB = 17$, $BC = 8$, $AD = 10$, $x_C = 21$, $y_C = -3$, $y_D = 18$, $\varphi_0 = \pi$.

Задача 27.18.



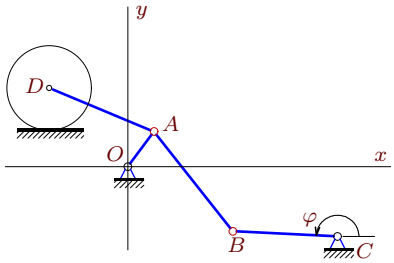
$\omega_{BC_z} = 25$ рад/с, $OA = 25$, $AB = 10$, $BC = 12$, $AD = 13$, $x_C = 11$, $y_C = -32$, $y_D = -19$, $\varphi_0 = \pi$.

Задача 27.19.



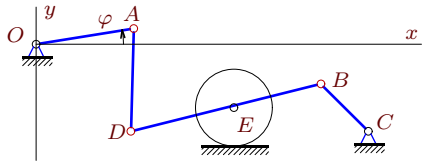
$\omega_{OA_z} = 15$ рад/с, BC=10, $DE = BE = 10$, $OA = 8$, $AD = 10$, $x_C = 30$, $y_C = -6$, $y_E = -4$, $\varphi_0 = 0$.

Задача 27.20.



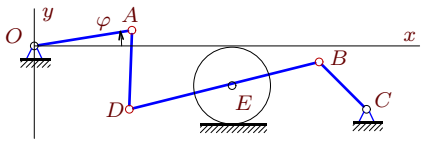
$v_{Dx} = -63$ см/с, $OA = 5$, $AB = 15$, $BC = 12$, $AD = 13$, $x_C = 24$, $y_C = -8$, $y_D = 9$, $\varphi_0 = \pi$.

Задача 27.21.



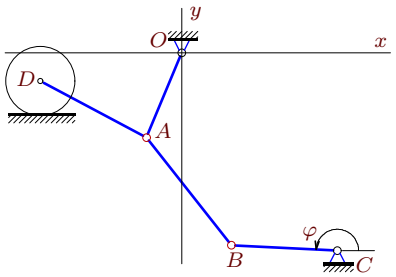
$\omega_{OA_z} = 13$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 13$, $x_C = 42$, $y_C = -11$, $y_E = -8$, $\varphi_0 = 0$.

Задача 27.22.



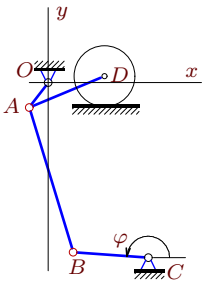
$v_{Ex} = -105$ см/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 10$, $x_C = 42$, $y_C = -8$, $y_E = -5$, $\varphi_0 = 0$.

Задача 27.23.



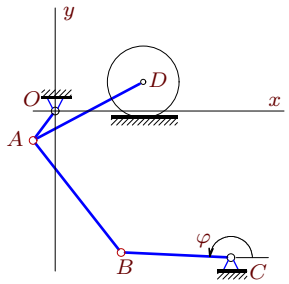
$\omega_{BC_z} = -56$ рад/с, $OA = 13$, $AB = 20$, $BC = 15$, $AD = 17$, $x_C = 22$, $y_C = -28$, $y_D = -4$, $\varphi_0 = \pi$.

Задача 27.24.



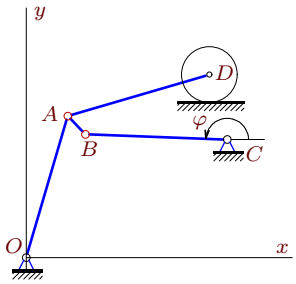
$\omega_{OA_z} = 72$ рад/с, $OA = 5$, $AB = 25$, $BC = 12$, $AD = 13$, $x_C = 16$, $y_C = -28$, $y_D = 1$, $\varphi_0 = \pi$.

Задача 27.25.



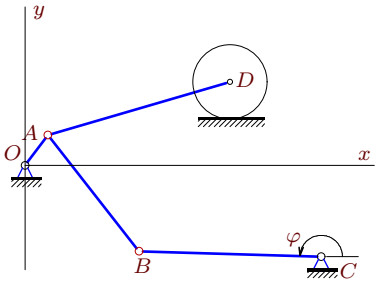
$v_{Dx} = -48$ см/с, $OA = 5$, $AB = 20$, $BC = 15$, $AD = 17$, $x_C = 24$, $y_C = -20$, $y_D = 4$, $\varphi_0 = \pi$.

Задача 27.26.



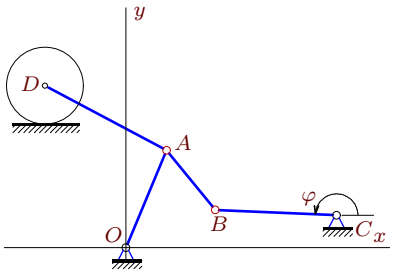
$\omega_{BC_z} = -25$ рад/с, $OA = 25$, $AB = 5$, $BC = 24$, $AD = 25$, $x_C = 34$, $y_C = 20$, $y_D = 31$, $\varphi_0 = \pi$.

Задача 27.27.



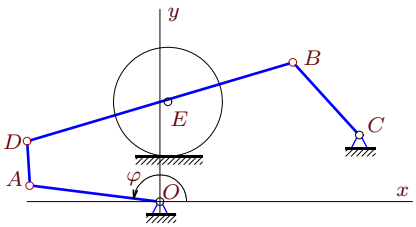
$\omega_{OA_z} = 8$ рад/с, $OA = 5$, $AB = 20$, $BC = 24$, $AD = 25$, $x_C = 39$, $y_C = -12$, $y_D = 11$, $\varphi_0 = \pi$.

Задача 27.28.



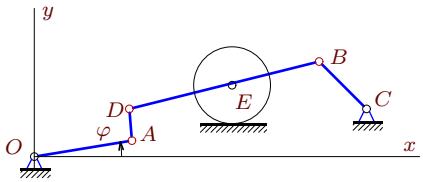
$v_{Dx} = -440$ см/с, $OA = 13$, $AB = 10$, $BC = 15$, $AD = 17$, $x_C = 26$, $y_C = 4$, $y_D = 20$, $\varphi_0 = \pi$.

Задача 27.29.



$v_{Ex} = -42$ см/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 4$, $x_C = 18$, $y_C = 6$, $y_E = 9$, $\varphi_0 = \pi$.

Задача 27.30.



$v_{Ex} = -42$ см/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 4$, $x_C = 42$, $y_C = 6$, $y_E = 9$, $\varphi_0 = 0$.

27.3

Кинематический анализ плоского механизма (2)

№	ω_{OA_z}	ω_{AB_z}	ω_{BC_z}	ω_{AD_z}	ω_{BD_z}	v_{Dx}	v_{Ex}
1	−8	–	–	−13	−8	–	−168
2	2	–	4	13	−2	–	–
3	–	–	6	13	−3	–	−63
4	−45	60	–	−36	–	432	–
5	–	−24	25	−18	–	−702	–
6	–	–	6	13	−3	–	−63
7	–	–	6	13	−3	–	−63
8	8	−12	–	5	–	−66	–
9	–	–	10	26	−5	–	−105
10	–	–	4	13	−2	–	−42
11	–	−60	77	32	–	−288	–
12	15	45	–	−5	–	140	–
13	–	8	−14	9	–	150	–
14	−15	–	–	−26	−15	–	−315
15	−45	15	–	9	–	252	–
16	–	−8	6	−3	–	−117	–
17	−40	−32	–	−25	–	−630	–
18	12	−36	–	7	–	−253	–
19	–	–	20	−34	−15	–	−250
20	−12	−4	6	−3	–	–	–
21	–	–	26	−26	−13	–	−273
22	5	–	10	−13	−5	–	–
23	−60	45	–	20	–	880	–
24	–	−12	25	18	–	−198	–
25	20	−5	8	4	–	–	–
26	24	144	–	−7	–	527	–
27	–	2	−2	−1	–	25	–
28	−30	−45	28	−10	–	–	–
29	−2	–	4	13	−2	–	–
30	2	–	4	13	−2	–	–