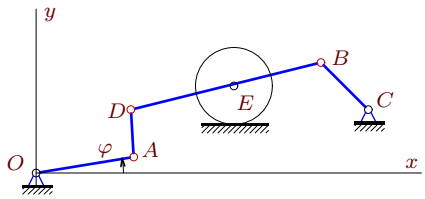
Кинематический анализ плоского механизма (2)

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 $\varphi = \varphi_0$.

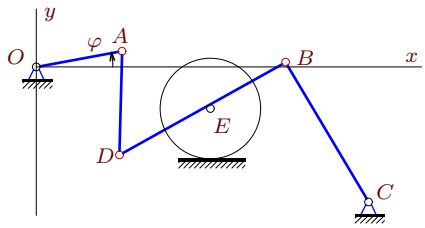
Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.158.)

Задача 27.1. 2



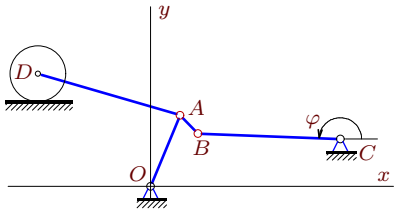
$\omega_{BC_z} = 6$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 6$, $x_C = 42$, $y_C = 8$, $y_E = 11$, $\varphi_0 = 0$.

Задача 27.2. 2



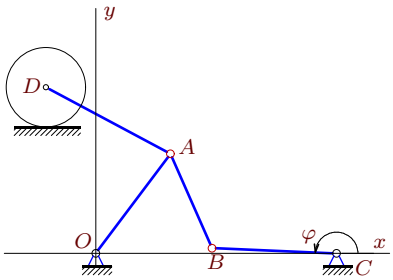
$\omega_{OA_z} = 10$ рад/с, BC=17, $DE = BE = 10$, $OA = 8$, $AD = 10$, $x_C = 32$, $y_C = -13$, $y_E = -4$, $\varphi_0 = 0$.

Задача 27.3. 2



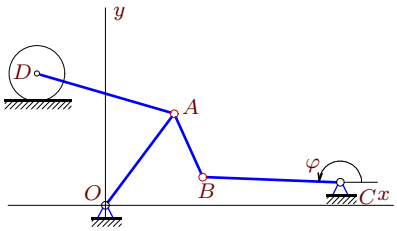
$v_{Dx} = -323$ см/с, $OA = 13$, $AB = 5$, $BC = 24$, $AD = 25$, $x_C = 32$, $y_C = 8$, $y_D = 19$, $\varphi_0 = \pi$.

Задача 27.4. 2



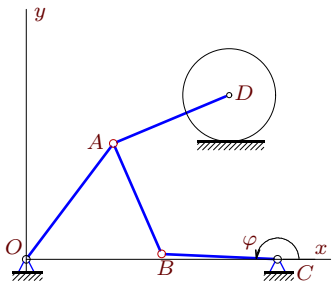
$\omega_{BC_z} = 14$ рад/с, $OA = 15$, $AB = 13$, $BC = 15$, $AD = 17$, $x_C = 29$, $y_C = 0$, $y_D = 20$, $\varphi_0 = \pi$.

Задача 27.5. 2



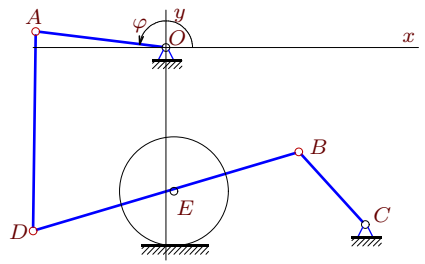
$\omega_{OA_z} = -18$ рад/с, $OA = 20$, $AB = 13$, $BC = 24$, $AD = 25$, $x_C = 41$, $y_C = 4$, $y_D = 23$, $\varphi_0 = \pi$.

Задача 27.6. 2



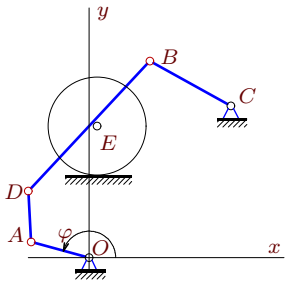
$\omega_{BC_z} = -14$ рад/с, $OA = 15$, $AB = 13$, $BC = 12$, $AD = 13$, $x_C = 26$, $y_C = 0$, $y_D = 17$, $\varphi_0 = \pi$.

Задача 27.7.



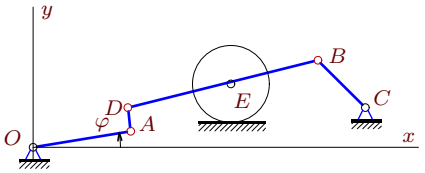
$\omega_{BC_z} = 18$ рад/с, BC=10,
$DE = BE = 13$, $OA = 12$,
$AD = 18$, $x_C = 18$, $y_C = -16$,
$y_E = -13$, $\varphi_0 = \pi$.

Задача 27.8.



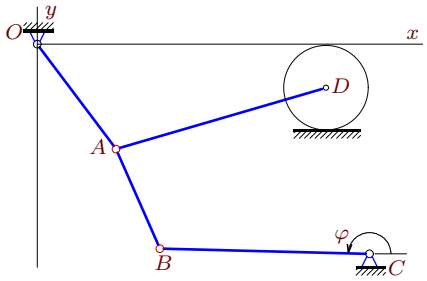
$\omega_{BC_z} = 15$ рад/с, BC=10,
$DE = BE = 10$, $OA = 6$,
$AD = 5$, $x_C = 14$, $y_C = 15$,
$y_E = 13$, $\varphi_0 = \pi$.

Задача 27.9.



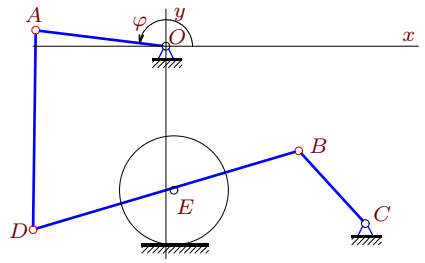
$\omega_{OA_z} = 3$ рад/с, BC=10,
$DE = BE = 13$, $OA = 12$,
$AD = 3$, $x_C = 42$, $y_C = 5$,
$y_E = 8$, $\varphi_0 = 0$.

Задача 27.10.



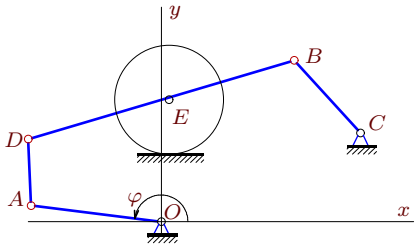
$v_{Dx} = -351$ см/с, $OA = 15$,
$AB = 13$, $BC = 24$, $AD = 25$,
$x_C = 38$, $y_C = -24$, $y_D = -5$,
$\varphi_0 = \pi$.

Задача 27.11.



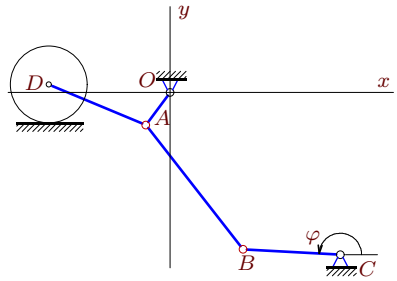
$\omega_{OA_z} = -9$ рад/с, BC=10,
$DE = BE = 13$, $OA = 12$,
$AD = 18$, $x_C = 18$, $y_C = -16$,
$y_E = -13$, $\varphi_0 = \pi$.

Задача 27.12.



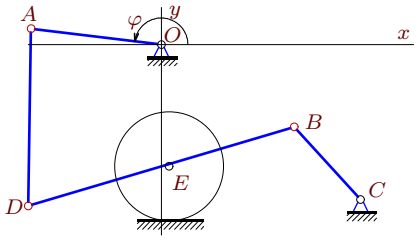
$\omega_{BC_z} = 6$ рад/с, BC=10,
$DE = BE = 13$, $OA = 12$,
$AD = 6$, $x_C = 18$, $y_C = 8$,
$y_E = 11$, $\varphi_0 = \pi$.

Задача 27.13.



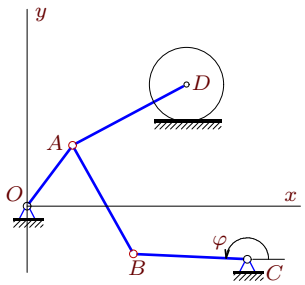
$v_{Dx} = 21$ см/с, $OA = 5$, $AB = 20$, $BC = 12$, $AD = 13$, $x_C = 21$, $y_C = -20$, $y_D = 1$, $\varphi_0 = \pi$.

Задача 27.14.



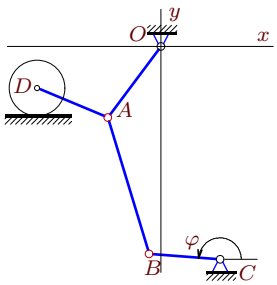
$\omega_{OA_z} = -8$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 16$, $x_C = 18$, $y_C = -14$, $y_E = -11$, $\varphi_0 = \pi$.

Задача 27.15.



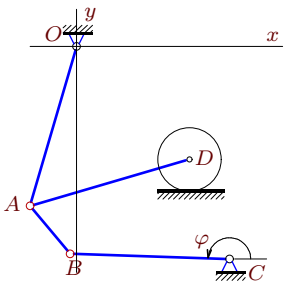
$\omega_{OA_z} = 225$ рад/с, $OA = 10$, $AB = 17$, $BC = 15$, $AD = 17$, $x_C = 29$, $y_C = -7$, $y_D = 16$, $\varphi_0 = \pi$.

Задача 27.16.



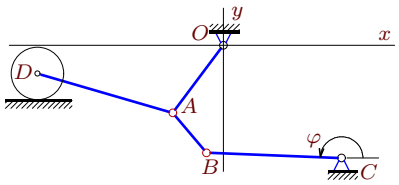
$\omega_{OA_z} = -24$ рад/с, $OA = 15$, $AB = 25$, $BC = 12$, $AD = 13$, $x_C = 10$, $y_C = -36$, $y_D = -7$, $\varphi_0 = \pi$.

Задача 27.17.



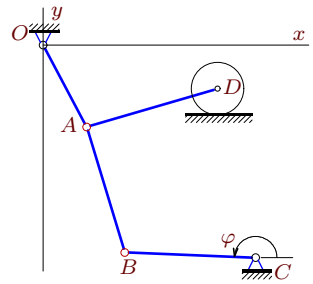
$\omega_{BC_z} = 25$ рад/с, $OA = 25$, $AB = 10$, $BC = 24$, $AD = 25$, $x_C = 23$, $y_C = -32$, $y_D = -17$, $\varphi_0 = \pi$.

Задача 27.18.



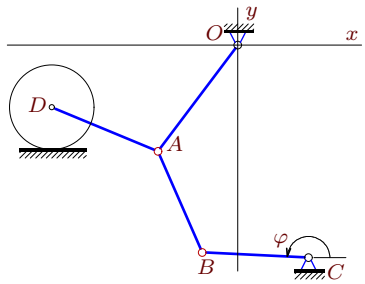
$\omega_{BC_z} = -6$ рад/с, $OA = 15$, $AB = 10$, $BC = 24$, $AD = 25$, $x_C = 21$, $y_C = -20$, $y_D = -5$, $\varphi_0 = \pi$.

Задача 27.19.



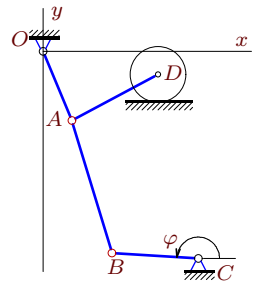
$\omega_{OA_z} = 192$ рад/с, $OA = 17$, $AB = 25$, $BC = 24$, $AD = 25$, $x_C = 39$, $y_C = -39$, $y_D = -8$, $\varphi_0 = \pi$.

Задача 27.20.



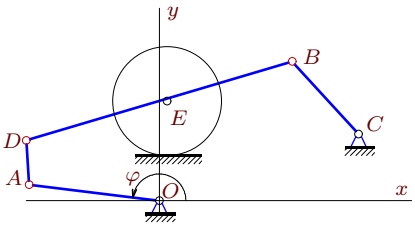
$v_{Dx} = 189$ см/с, $OA = 15$, $AB = 13$, $BC = 12$, $AD = 13$, $x_C = 8$, $y_C = -24$, $y_D = -7$, $\varphi_0 = \pi$.

Задача 27.21.



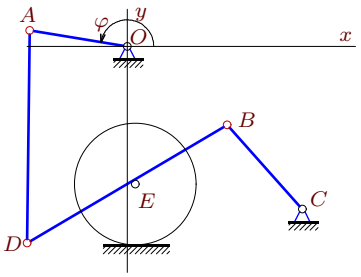
$\omega_{OA_z} = 30$ рад/с, $OA = 13$, $AB = 25$, $BC = 15$, $AD = 17$, $x_C = 27$, $y_C = -36$, $y_D = -4$, $\varphi_0 = \pi$.

Задача 27.22.



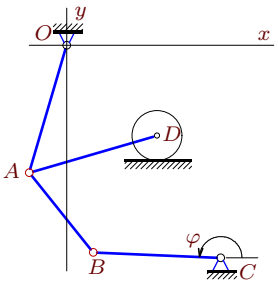
$\omega_{OA_z} = -2$ рад/с, BC=10, $DE = BE = 13$, $OA = 12$, $AD = 4$, $x_C = 18$, $y_C = 6$, $y_E = 9$, $\varphi_0 = \pi$.

Задача 27.23.



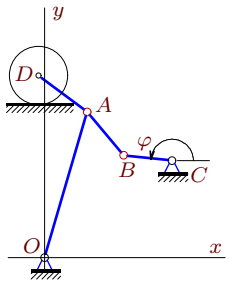
$\omega_{BC_z} = 68$ рад/с, BC=10, $DE = BE = 10$, $OA = 8$, $AD = 17$, $x_C = 14$, $y_C = -13$, $y_E = -11$, $\varphi_0 = \pi$.

Задача 27.24.



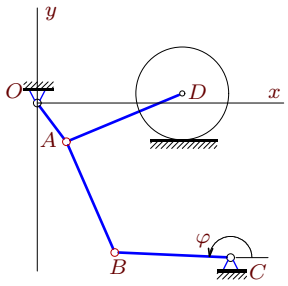
$\omega_{BC_z} = 25$ рад/с, $OA = 25$, $AB = 20$, $BC = 24$, $AD = 25$, $x_C = 29$, $y_C = -40$, $y_D = -17$, $\varphi_0 = \pi$.

Задача 27.25.



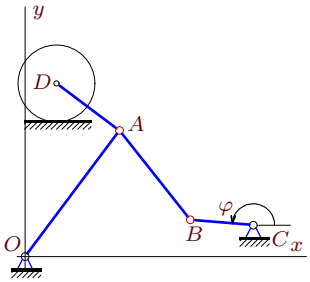
$\omega_{BC_z} = 25$ рад/с, $OA = 25$, $AB = 10$, $BC = 8$, $AD = 10$, $x_C = 21$, $y_C = 16$, $y_D = 30$, $\varphi_0 = \pi$.

Задача 27.26.



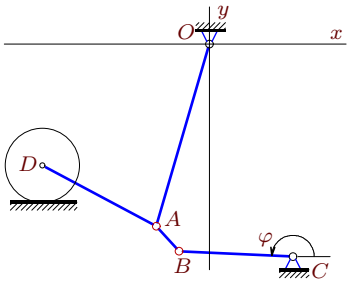
$v_{Dx} = -189$ см/с, $OA = 5$, $AB = 13$, $BC = 12$, $AD = 13$, $x_C = 20$, $y_C = -16$, $y_D = 1$, $\varphi_0 = \pi$.

Задача 27.27.



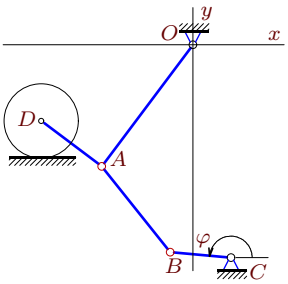
$v_{Dx} = -150$ см/с, $OA = 20$, $AB = 15$, $BC = 8$, $AD = 10$, $x_C = 29$, $y_C = 4$, $y_D = 22$, $\varphi_0 = \pi$.

Задача 27.28.



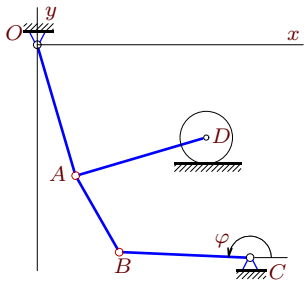
$\omega_{BC_z} = -25$ рад/с, $OA = 25$, $AB = 5$, $BC = 15$, $AD = 17$, $x_C = 11$, $y_C = -28$, $y_D = -16$, $\varphi_0 = \pi$.

Задача 27.29.



$\omega_{OA_z} = -6$ рад/с, $OA = 20$, $AB = 15$, $BC = 8$, $AD = 10$, $x_C = 5$, $y_C = -28$, $y_D = -10$, $\varphi_0 = \pi$.

Задача 27.30.



$\omega_{BC_z} = 29$ рад/с, $OA = 25$, $AB = 17$, $BC = 24$, $AD = 25$, $x_C = 39$, $y_C = -39$, $y_D = -17$, $\varphi_0 = \pi$.

27.2

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	3	–	–	13	−3	–	−63
2	–	–	10	−27	−10	–	−210
3	−24	−72	14	−5	–	–	–
4	−15	−15	–	−9	–	−252	–
5	–	−24	14	−9	–	−351	–
6	12	12	–	−9	–	99	–
7	−9	–	–	−13	−9	–	−189
8	−20	–	–	82	−20	–	−250
9	–	–	6	26	−3	–	−63
10	24	−24	−4	−9	–	–	–
11	–	–	18	−13	−9	–	−189
12	−3	–	–	13	−3	–	−63
13	−4	1	−2	1	–	–	–
14	–	–	16	−13	−8	–	−168
15	–	120	−154	−90	–	1080	–
16	–	12	−25	18	–	378	–
17	24	−72	–	7	–	−527	–
18	−8	12	–	3	–	117	–
19	–	−120	−29	−64	–	−3328	–
20	−12	12	−14	9	–	–	–
21	–	−15	−3	−10	–	−440	–
22	–	–	4	13	−2	–	−42
23	−51	–	–	−68	−51	–	−850
24	24	−36	–	7	–	−527	–
25	−8	−24	–	−7	–	−234	–
26	36	−12	−4	−9	–	–	–
27	−6	−8	18	−9	–	–	–
28	−15	90	–	7	–	416	–
29	–	8	−18	9	–	150	–
30	120	−192	–	−35	–	−3125	–