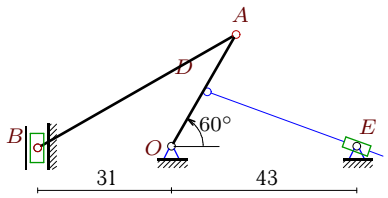
Механизм с муфтой (1)

Плоский механизм с одной степенью свободы состоит из шарнирно соединенных стержней и муфты, скользящей по направляющему стержню и шарнирно закрепленной на другом стержне или вращающейся на неподвижном шарнире. Кривошип OA вращается против часовой стрелки с постоянной угловой скоростью ω_{OA}. Горизонтальные и вертикальные размеры на рисунках даны для неподвижных шарниров и для линий движения ползунов (в см). Найти скорость муфты D (или E) относительно направляющего стержня (в см/с).

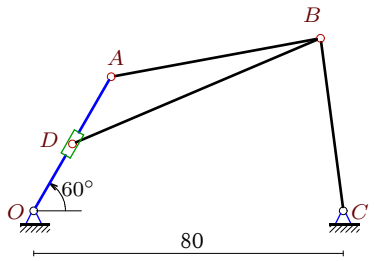
Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.216.)

Задача К13.1. *8*



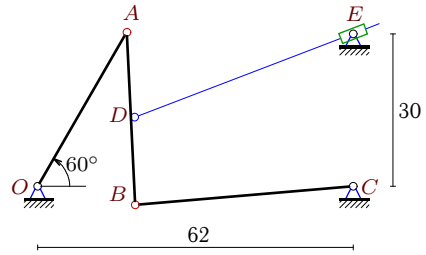
$\omega_{OA} = 29\frac{1}{c}$, $\alpha = 60°$, $OA = 30$, $AB = 53$, $OD{=}OA/2$.

Задача К13.2. *8*



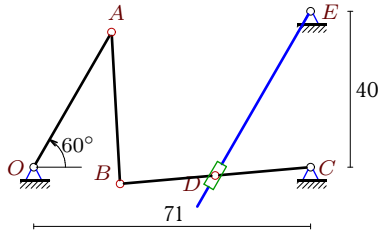
$\omega_{OA} = 16\frac{1}{c}$, $\alpha = 60°$, $OA = 40$, $AB = 55$, $BC = 45$, $OD{=}OA/2$.

Задача К13.3. *8*



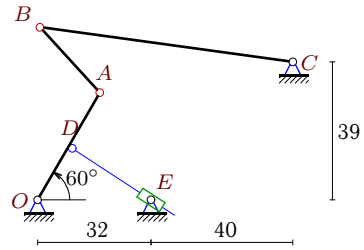
$\omega_{OA} = 22\frac{1}{c}$, $\alpha = 60°$, $OA = 35$, $AB = 34$, $BC = 43$, $AD{=}AB/2$.

Задача К13.4. *8*



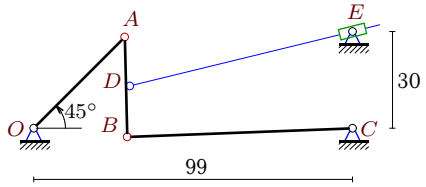
$\omega_{OA} = 22\frac{1}{c}$, $\alpha = 60°$, $OA = 40$, $AB = 39$, $BC = 49$, $BD{=}BC/2$.

Задача К13.5. *8*



$\omega_{OA} = 29\frac{1}{c}$, $\alpha = 60°$, $OA = 35$, $AB = 25$, $BC = 72$, $OD{=}OA/2$.

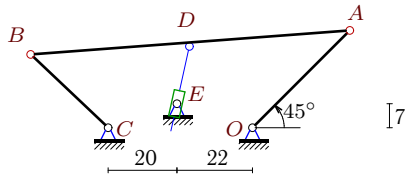
Задача К13.6. *8*



$\omega_{OA} = 8\frac{1}{c}$, $\alpha = 45°$, $OA = 40$, $AB = 31$, $BC = 70$, $AD{=}AB/2$.

Задача К13.7.

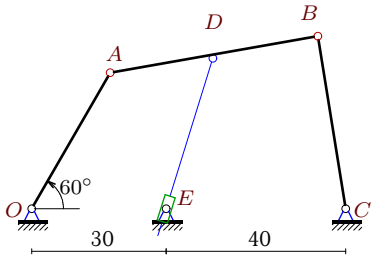
8



$\omega_{OA} = 8\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 93$, $BC = 31$, AD=$AB/2$.

Задача К13.8.

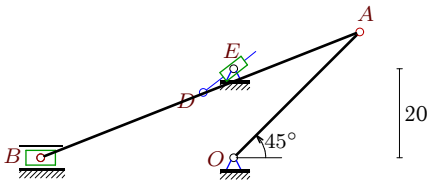
8



$\omega_{OA} = 11\frac{1}{c}$, $\alpha = 60°$, $OA = 35$,
$AB = 47$, $BC = 39$, AD=$AB/2$.

Задача К13.9.

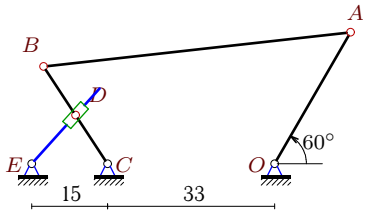
8



$\omega_{OA} = 5\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 77$, AD=$AB/2$.

Задача К13.10.

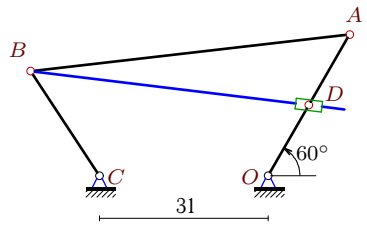
8



$\omega_{OA} = 11\frac{1}{c}$, $\alpha = 60°$, $OA = 30$,
$AB = 61$, $BC = 23$, BD=$BC/2$.

Задача К13.11.

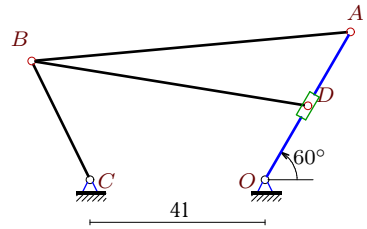
8



$\omega_{OA} = 1\frac{1}{c}$, $\alpha = 60°$, $OA = 30$,
$AB = 59$, $BC = 23$, OD=$OA/2$.

Задача К13.12.

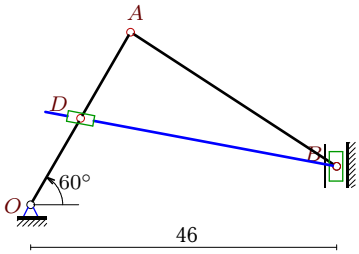
8



$\omega_{OA} = 19\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 75$, $BC = 31$, OD=$OA/2$.

Задача К13.13.

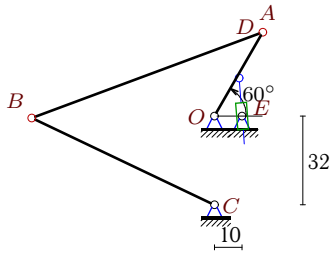
8



$\omega_{OA} = 21\frac{1}{c}$, $\alpha = 60°$, $OA = 30$,
$AB = 37$, OD=$OA/2$.

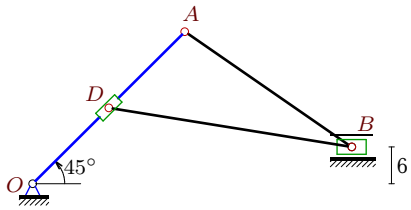
Задача К13.14.

8



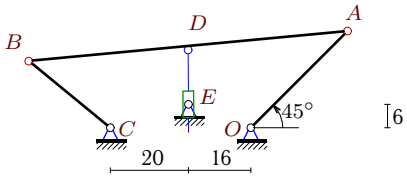
$\omega_{OA} = 5\frac{1}{c}$, $\alpha = 60°$, $OA = 35$,
$AB = 89$, $BC = 73$, OD=$OA/2$.

Задача К13.15.



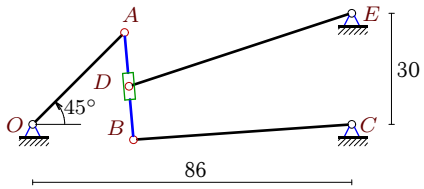
$\omega_{OA} = 24\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 33$, OD=$OA/2$.

Задача К13.16.



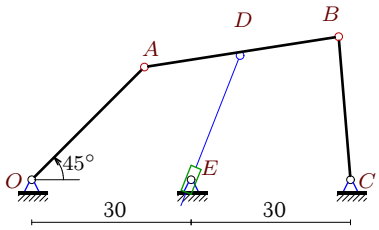
$\omega_{OA} = 5\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 82$, $BC = 27$, AD=$AB/2$.

Задача К13.17.



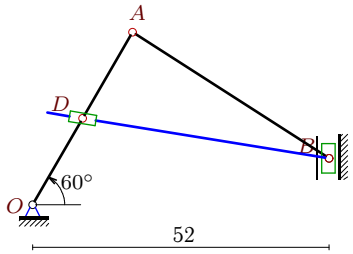
$\omega_{OA} = 2\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 29$, $BC = 59$, AD=$AB/2$.

Задача К13.18.



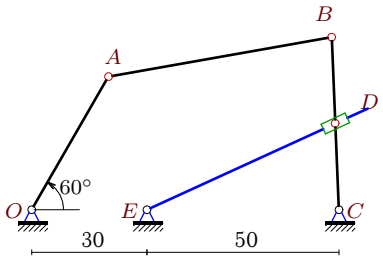
$\omega_{OA} = 12\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 37$, $BC = 27$, AD=$AB/2$.

Задача К13.19.



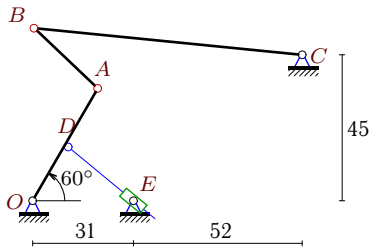
$\omega_{OA} = 9\frac{1}{c}$, $\alpha = 60°$, $OA = 35$,
$AB = 41$, OD=$OA/2$.

Задача К13.20.



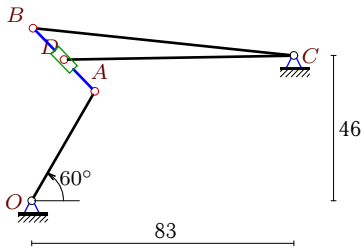
$\omega_{OA} = 8\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 59$, $BC = 45$, BD=$BC/2$.

Задача К13.21.



$\omega_{OA} = 30\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 27$, $BC = 83$, OD=$OA/2$.

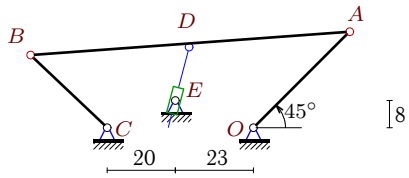
Задача К13.22.



$\omega_{OA} = 29\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 28$, $BC = 83$, AD=$AB/2$.

Задача К13.23.

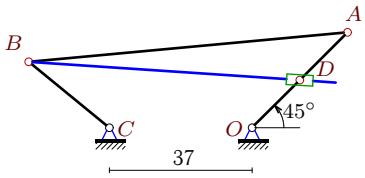
8



$\omega_{OA} = 4\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 94$, $BC = 31$, AD=$AB/2$.

Задача К13.24.

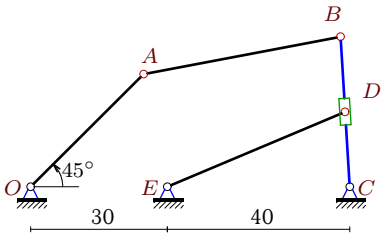
8



$\omega_{OA} = 25\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 83$, $BC = 27$, OD=$OA/2$.

Задача К13.25.

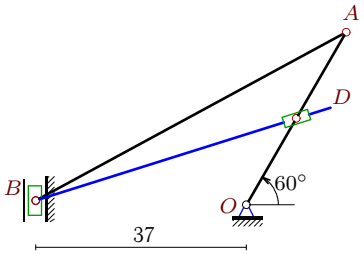
8



$\omega_{OA} = 24\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 44$, $BC = 33$, BD=$BC/2$.

Задача К13.26.

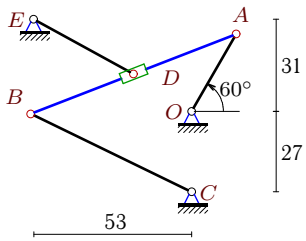
8



$\omega_{OA} = 27\frac{1}{c}$, $\alpha = 60°$, $OA = 35$,
$AB = 62$, OD=$OA/2$.

Задача К13.27.

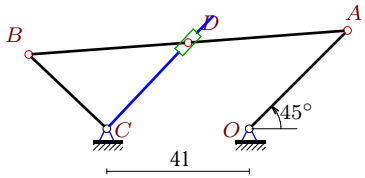
8



$\omega_{OA} = 8\frac{1}{c}$, $\alpha = 60°$, $OA = 30$,
$AB = 74$, $BC = 60$, AD=$AB/2$.

Задача К13.28.

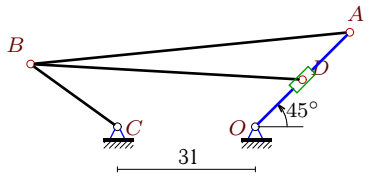
8



$\omega_{OA} = 32\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 92$, $BC = 31$, AD=$AB/2$.

Задача К13.29.

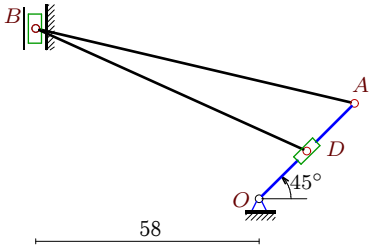
8



$\omega_{OA} = 5\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 72$, $BC = 24$, OD=$OA/2$.

Задача К13.30.

8



$\omega_{OA} = 21\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 85$, OD=$OA/2$.

К13 **Ответы.**
Механизм с муфтой (1)

30.04.2012

№	v_A	v_B	v_D	v_r	x_B	y_B
1	870	881.5613	435.0000	-428.5211	-31.000	-0.344
2	640	487.6961	320.0000	347.3334	74.089	44.610
3	770	417.2790	532.5391	-185.2676	19.155	-3.649
4	880	482.3202	241.1601	197.2957	22.189	-4.298
5	1015	1508.7153	507.5000	-506.7582	0.670	48.797
6	320	231.8333	257.4102	-59.8224	29.052	-2.706
7	320	281.7050	210.5217	34.2361	-64.458	21.369
8	385	294.8073	320.5896	22.7525	63.781	38.501
9	200	85.5687	133.7203	-46.1165	-43.333	0.000
10	330	298.0911	149.0455	144.2314	-45.625	19.225
11	30	26.9681	15.0000	-6.7883	-43.613	19.233
12	760	664.9448	380.0000	525.8899	-54.689	27.814
13	630	1152.3418	315.0000	-85.0487	46.000	5.782
14	175	155.7302	87.5000	-49.8308	-65.934	-0.668
15	840	1004.0414	420.0000	1111.4202	51.905	6.000
16	175	158.8872	112.1900	-0.9401	-56.894	17.101
17	70	53.4242	57.8834	39.9847	27.146	-4.152
18	360	212.8961	261.7258	-24.5819	57.772	26.908
19	315	582.3446	157.5000	-54.2172	52.000	8.158
20	320	247.0683	123.5342	114.3828	78.091	44.959
21	1200	1904.1498	600.0000	-591.7448	0.408	53.219
22	1160	1747.1025	1229.4159	568.8431	0.456	54.692
23	160	141.0905	105.3319	21.4029	-65.461	21.366
24	875	796.5098	437.5000	-132.4770	-57.898	17.096
25	840	476.8177	238.4089	677.4035	67.980	32.938
26	945	1036.4170	472.5000	8.1207	-37.000	0.752
27	240	205.1653	152.1704	178.6009	-53.981	-0.808
28	1280	1124.8796	841.5082	543.6885	-63.456	21.372
29	150	143.1095	75.0000	31.9811	-50.433	14.084
30	735	2732.7723	367.5000	2213.6966	-58.000	44.182

K13 файл o13k8A

№	ω_{AB}	ω_{BC}	ω_e	ε_{AB}	ε_{BC}	ε_e	a_A	a_B	a_D	a_r
1	28.621	–	1.979	-952.185	-	-373.601	252.300	435.149	126.150	−23.171
2	-7.101	10.838	16.000	54.128	203.563	271.135	102.400	105.758	51.200	159.224
3	18.594	-9.704	10.681	391.656	61.275	-238.002	169.400	48.311	87.338	−103.225
4	18.486	-9.843	-2.847	396.067	61.662	34.642	193.600	56.275	28.138	−2.657
5	-58.655	-20.954	-0.988	1453.592	1531.665	-493.429	294.350	1147.219	147.175	7.683
6	7.012	-3.312	3.458	84.700	3.588	-17.644	25.600	8.079	11.396	−16.089
7	4.640	9.087	-11.381	18.559	72.040	-52.204	25.600	33.971	27.018	3.321
8	-5.175	7.559	-8.879	22.841	101.282	-59.661	42.350	45.353	43.090	11.006
9	1.975	–	13.163	-8.333	-	-112.422	10.000	6.635	7.712	−24.101
10	5.421	12.960	2.900	26.112	102.880	-56.688	36.300	45.304	22.652	15.229
11	0.508	1.173	0.452	0.214	0.819	0.318	0.300	0.368	0.150	0.014
12	9.019	21.450	19.000	57.784	253.404	-538.003	144.400	162.832	72.200	402.089
13	27.011	–	26.247	1447.223	-	1253.446	132.300	481.435	66.150	−203.193
14	2.735	2.133	-4.730	-0.971	4.588	14.613	8.750	4.717	4.375	0.194
15	-21.872	–	24.000	194.656	-	2775.340	201.600	235.970	100.800	931.070
16	3.022	5.885	-7.517	8.490	31.103	-13.663	8.750	12.568	9.546	0.861
17	1.583	-0.905	1.583	5.345	0.292	-20.302	1.400	0.514	0.616	13.361
18	-7.443	7.885	-10.074	34.166	201.178	-93.912	43.200	56.853	49.033	13.108
19	12.314	–	11.844	300.150	-	254.620	28.350	112.593	14.175	−48.514
20	-2.935	5.490	0.865	14.908	44.300	-0.995	25.600	24.113	12.056	11.387
21	-66.088	-22.942	-3.644	2095.629	1804.660	-493.732	360.000	1560.269	180.000	26.142
22	-59.226	-21.049	-59.226	1402.183	1490.363	2509.010	336.400	1290.510	780.762	801.690
23	2.297	4.551	-5.929	4.665	18.289	-15.583	6.400	8.566	6.798	0.680
24	14.946	29.500	13.302	214.040	792.900	274.137	218.750	317.874	109.375	14.656
25	-14.415	14.449	14.449	174.448	761.676	1469.594	201.600	260.624	130.312	580.732
26	27.687	–	27.871	-981.730	-	-1245.536	255.150	540.661	127.575	−116.198
27	4.415	3.419	4.415	-2.630	12.093	18.100	19.200	10.093	13.501	12.828
28	18.748	36.286	18.821	295.197	1134.443	21.580	409.600	538.783	429.475	260.597
29	3.098	5.963	5.000	9.515	33.082	9.482	7.500	11.656	3.750	0.758
30	-26.744	–	21.000	2484.007	-	-6160.200	154.350	2303.622	77.175	6900.642