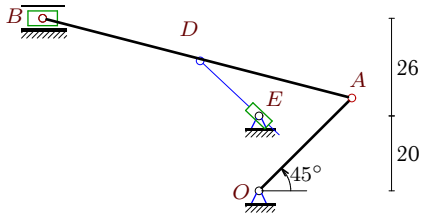
Механизм с муфтой (1)

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.

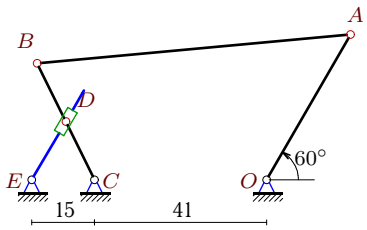
6



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

Задача К13.2.

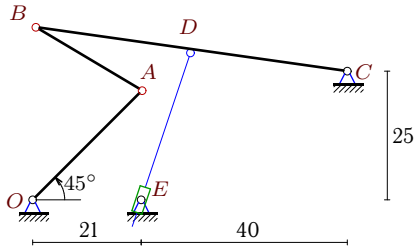
6



$\omega_{OA} = 22\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 75$, $BC = 31$, BD=$BC/2$.

Задача К13.3.

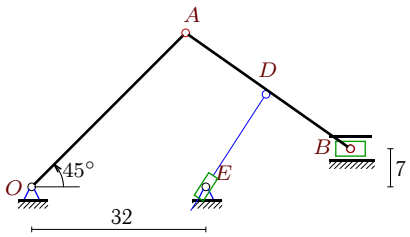
6



$\omega_{OA} = 31\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 24$, $BC = 61$, BD=$BC/2$.

Задача К13.4.

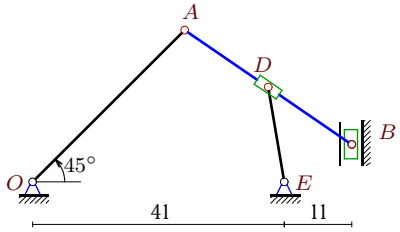
6



$\omega_{OA} = 12\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 37$, AD=$AB/2$.

Задача К13.5.

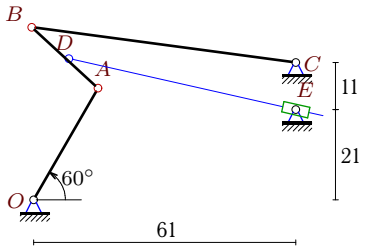
6



$\omega_{OA} = 28\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 33$, AD=$AB/2$.

Задача К13.6.

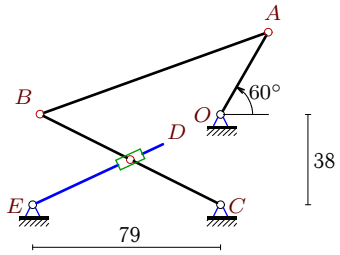
6



$\omega_{OA} = 27\frac{1}{c}$, $\alpha = 60°$, $OA = 30$,
$AB = 21$, $BC = 62$, AD=$AB/2$.

Задача К13.7.

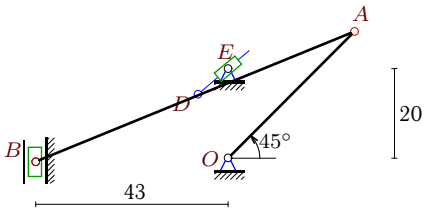
6



$\omega_{OA} = 27\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 102$, $BC = 85$, BD=$BC/2$.

Задача К13.8.

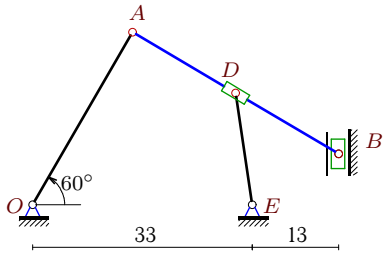
6



$\omega_{OA} = 12\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 77$, AD=$AB/2$.

Задача К13.9.

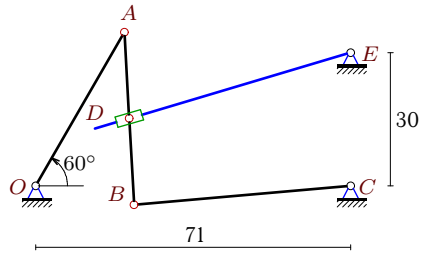
6



$\omega_{OA} = 22\frac{1}{c}$, $\alpha = 60°$, $OA = 30$,
$AB = 36$, AD=$AB/2$.

Задача К13.10.

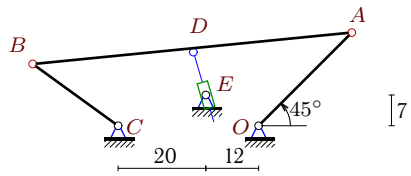
6



$\omega_{OA} = 33\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 39$, $BC = 49$, AD=$AB/2$.

Задача К13.11.

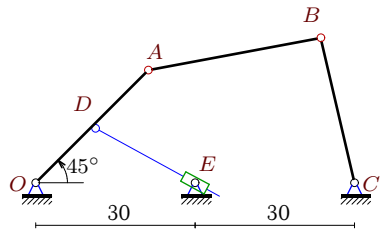
6



$\omega_{OA} = 33\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 73$, $BC = 24$, AD=$AB/2$.

Задача К13.12.

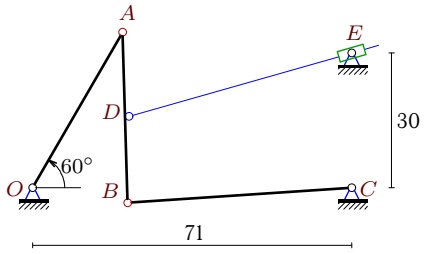
6



$\omega_{OA} = 19\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 33$, $BC = 28$, OD=$OA/2$.

Задача К13.13.

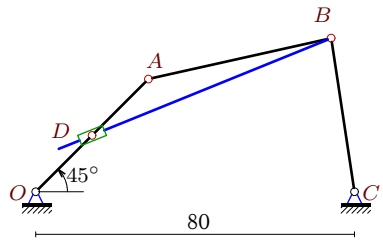
6



$\omega_{OA} = 3\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 38$, $BC = 50$, AD=$AB/2$.

Задача К13.14.

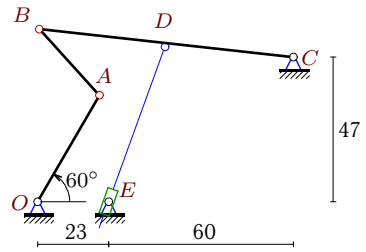
6



$\omega_{OA} = 31\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 47$, $BC = 39$, OD=$OA/2$.

Задача К13.15.

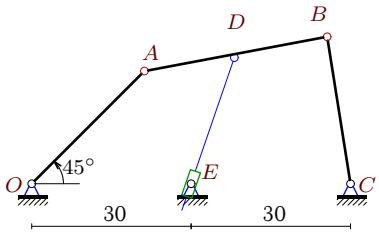
6



$\omega_{OA} = 15\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 29$, $BC = 83$, $BD{=}BC/2$.

Задача К13.16.

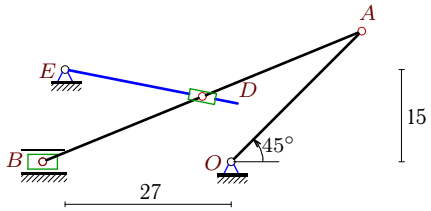
6



$\omega_{OA} = 20\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 35$, $BC = 28$, $AD{=}AB/2$.

Задача К13.17.

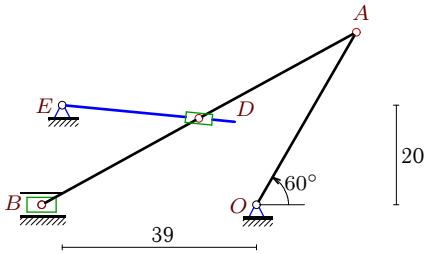
6



$\omega_{OA} = 16\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 56$, $AD{=}AB/2$.

Задача К13.18.

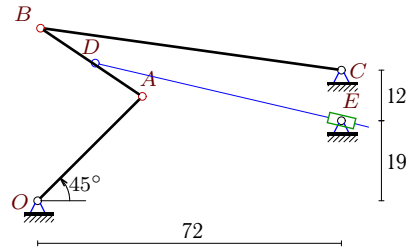
6



$\omega_{OA} = 6\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 72$, $AD{=}AB/2$.

Задача К13.19.

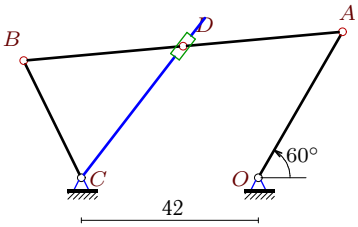
6



$\omega_{OA} = 32\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 29$, $BC = 72$, $AD{=}AB/2$.

Задача К13.20.

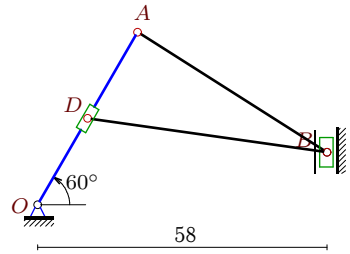
6



$\omega_{OA} = 21\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 76$, $BC = 31$, $AD{=}AB/2$.

Задача К13.21.

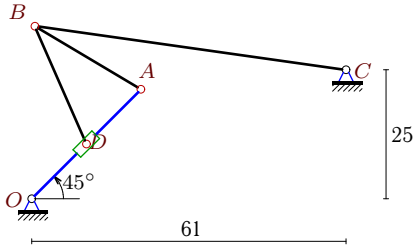
6



$\omega_{OA} = 4\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 45$, $OD{=}OA/2$.

Задача К13.22.

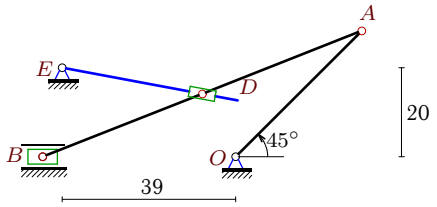
6



$\omega_{OA} = 25\frac{1}{c}$, $\alpha = 45°$, $OA = 30$,
$AB = 24$, $BC = 61$, $OD{=}OA/2$.

Задача К13.23.

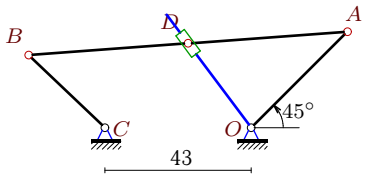
6



$\omega_{OA} = 25\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 77$, AD=$AB/2$.

Задача К13.24.

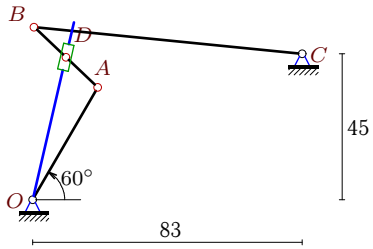
6



$\omega_{OA} = 15\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 94$, $BC = 31$, AD=$AB/2$.

Задача К13.25.

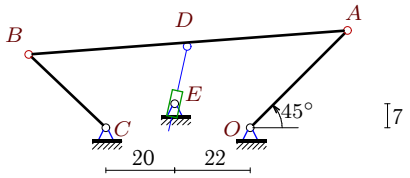
6



$\omega_{OA} = 25\frac{1}{c}$, $\alpha = 60°$, $OA = 40$,
$AB = 27$, $BC = 83$, AD=$AB/2$.

Задача К13.26.

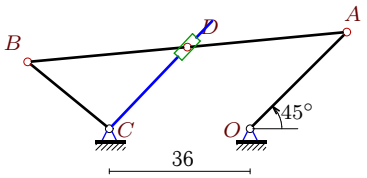
6



$\omega_{OA} = 23\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 93$, $BC = 31$, AD=$AB/2$.

Задача К13.27.

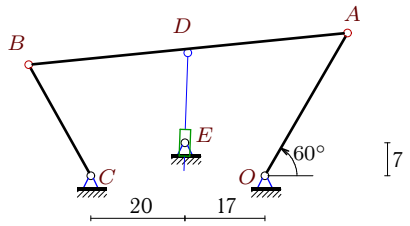
6



$\omega_{OA} = 17\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 82$, $BC = 27$, AD=$AB/2$.

Задача К13.28.

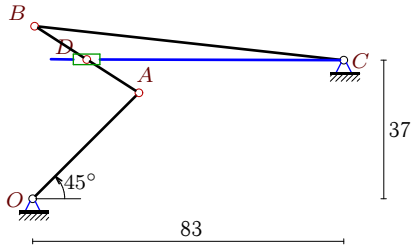
6



$\omega_{OA} = 19\frac{1}{c}$, $\alpha = 60°$, $OA = 35$,
$AB = 68$, $BC = 27$, AD=$AB/2$.

Задача К13.29.

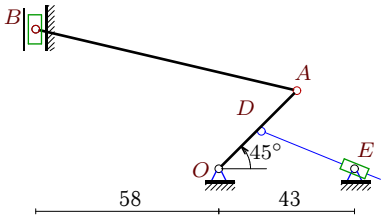
6



$\omega_{OA} = 18\frac{1}{c}$, $\alpha = 45°$, $OA = 40$,
$AB = 33$, $BC = 83$, AD=$AB/2$.

Задача К13.30.

6



$\omega_{OA} = 23\frac{1}{c}$, $\alpha = 45°$, $OA = 35$,
$AB = 85$, 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	35	31.1392	30.5613	-28.8502	-57.552	46.000
2	880	769.9361	384.9681	321.3647	-54.689	27.814
3	930	2328.6296	1164.3148	-1144.7698	0.595	33.496
4	480	578.1056	489.1414	106.7671	58.549	7.000
5	980	1707.6430	1249.3115	-1787.7155	52.000	6.138
6	810	1377.7307	922.6096	-447.6692	-0.456	40.198
7	1080	962.4414	481.2207	376.9209	-75.977	0.111
8	480	491.6568	185.9964	-178.5327	-43.000	-0.828
9	660	1298.0858	862.7519	-1345.9832	46.000	7.678
10	1320	723.4802	916.8164	-381.6909	22.189	-4.298
11	990	947.6928	628.8761	-143.8112	-51.437	14.078
12	570	322.5268	285.0000	-273.5096	53.652	27.271
13	120	63.0597	81.8581	-35.1886	21.112	-3.343
14	1240	665.5552	620.0000	406.2926	74.148	38.558
15	600	863.2455	431.6227	-419.3651	0.501	56.107
16	600	339.0676	422.5140	-51.8801	55.615	27.655
17	480	200.4865	318.8611	297.6615	-30.613	0.000
18	240	141.9875	184.9213	179.9199	-43.119	0.000
19	1120	2507.1031	1652.6329	-589.4851	0.689	40.940
20	840	735.9220	695.4745	386.9687	-55.693	27.812
21	160	298.4470	80.0000	-86.7502	58.000	10.537
22	750	1877.9271	375.0000	-3428.8895	0.595	33.496
23	1000	427.8436	668.6016	622.5839	-43.333	0.000
24	600	529.0894	394.9945	-252.8054	-65.461	21.366
25	1000	1586.7915	1098.2635	-932.3455	0.408	53.219
26	920	809.9020	605.2498	98.4287	-64.458	21.369
27	595	540.2165	381.4459	262.0855	-56.894	17.101
28	665	588.9587	545.5237	-4.4183	-50.165	23.573
29	720	1583.8247	1055.1446	-170.6738	0.499	46.088
30	805	2993.0364	402.5000	-370.5068	-58.000	44.182

K13 файл o13k6A

№	ω_{AB}	ω_{BC}	ω_e	ε_{AB}	ε_{BC}	ε_e	a_A	a_B	a_D	a_r
1	0.301	–	-0.448	-0.324	-	0.215	0.350	0.104	0.215	−0.089
2	10.443	24.837	13.147	77.472	339.744	208.886	193.600	218.312	109.156	68.737
3	-79.943	-38.174	-6.887	3786.291	2724.471	2419.523	288.300	1884.731	942.365	721.285
4	-11.215	–	-22.716	46.128	-	-397.316	57.600	68.975	58.510	−61.534
5	37.234	–	37.234	3072.580	-	-19966.529	274.400	901.306	366.704	−3112.418
6	-62.154	-22.221	14.649	2282.036	1709.928	-1361.837	218.700	1103.476	640.931	48.710
7	14.590	11.323	-6.616	-31.913	131.016	-281.205	291.600	155.813	77.906	−10.054
8	11.659	–	5.395	-192.908	-	313.741	57.600	136.354	51.969	12.705
9	31.229	–	31.229	2048.404	-	-13261.188	145.200	687.753	283.338	−2215.701
10	27.728	-14.765	-16.011	891.150	138.739	606.949	435.600	126.619	224.085	−246.032
11	20.200	39.487	-55.198	419.034	1475.596	-88.299	326.700	515.224	374.859	−3.104
12	-14.679	11.519	3.624	51.388	579.407	-324.784	108.300	166.433	54.150	−18.124
13	2.625	-1.261	1.409	7.113	0.951	-4.882	3.600	0.927	1.835	−1.994
14	-21.296	17.066	-6.419	275.604	1361.995	55.828	384.400	543.186	192.200	339.218
15	-28.619	-10.401	-1.862	271.245	359.757	172.373	90.000	311.804	155.902	132.536
16	-13.876	12.110	-16.226	89.565	590.462	-281.722	120.000	170.352	142.579	42.838
17	6.549	–	5.030	-87.229	-	-30.066	76.800	50.582	59.056	40.456
18	1.901	–	1.549	-17.774	-	-5.509	14.400	11.076	11.063	7.827
19	-70.290	-34.821	25.362	1563.167	1835.560	-1757.101	358.400	1583.905	868.327	8.555
20	9.843	23.739	14.638	70.705	313.535	112.277	176.400	199.921	182.935	84.849
21	5.749	–	4.000	65.374	-	0.742	6.400	27.265	3.200	−29.122
22	-64.470	-30.786	25.000	2462.468	1771.898	-13476.930	187.500	1225.762	93.750	2931.061
23	9.873	–	7.614	-208.336	-	-73.222	250.000	165.887	192.788	133.709
24	8.615	17.067	9.786	65.605	257.196	86.528	90.000	120.463	95.594	27.869
25	-55.073	-19.118	12.870	1455.298	1253.236	-933.378	250.000	1083.520	641.874	541.133
26	13.341	26.126	-32.721	153.401	595.452	-431.501	211.600	280.794	223.321	27.452
27	10.274	20.008	9.591	98.149	359.550	-20.841	101.150	145.282	110.350	68.326
28	9.158	21.813	-27.340	65.754	274.204	-129.511	126.350	148.277	132.899	−19.278
29	-38.336	-19.082	-15.177	349.821	505.943	470.283	129.600	517.384	283.028	−75.897
30	-29.291	–	4.761	2979.682	-	-364.796	185.150	2763.302	92.575	−43.657