

Кинематика плоского механизма

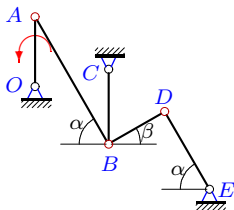
Многосвязный механизм приводится в движение кривошипом OA , вращающимся с известной угловой скоростью и случайным угловым ускорением с известным рядом распределения $p = [0.2, 0.3, 0.4, 0.1]$. Найти математическое ожидание угловых ускорений звеньев.

Длины звеньев даны в см, угловые скорости — в рад/с, угловые ускорения — в рад/с². Стержни, положение которых не определено углом, вертикальны или горизонтальны.

Курсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.— М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.183.)

Задача L-30.1.

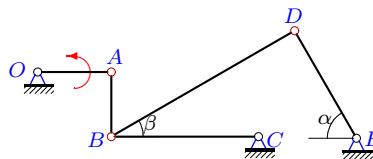
2



$\varepsilon_{OA} = [4, 4.2, 4.6, 5]$,
 $\omega_{OA} = 2$, $\alpha = 60^\circ$, $\beta = 30^\circ$, $OA = 28$,
 $AB = 59$, $BC = 30$, $BD = 26$, $DE = 36$.

Задача L-30.2.

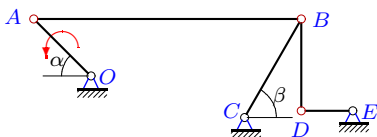
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$\varepsilon_{OA} = [3, 3.3, 3.7, 4.2]$,
 $\omega_{OA} = 1$, $\alpha = 60^\circ$, $\beta = 30^\circ$, $OA = 16$,
 $AB = 14$, $BC = 32$, $BD = 46$, $DE = 27$.

Задача L-30.3.

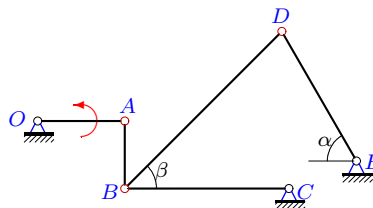
2



$\varepsilon_{OA} = [1, 1.2, 1.6, 2.1]$,
 $\omega_{OA} = 1$, $\alpha = 45^\circ$, $\beta = 60^\circ$, $OA = 22$,
 $AB = 73$, $BC = 31$, $BD = 25$, $DE = 14$.

Задача L-30.4.

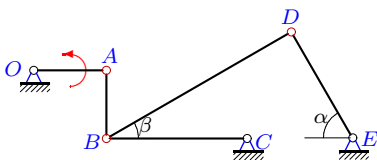
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$\varepsilon_{OA} = [4, 4.3, 4.6, 5.1]$,
 $\omega_{OA} = 1$, $\alpha = 60^\circ$, $\beta = 45^\circ$, $OA = 18$,
 $AB = 14$, $BC = 34$, $BD = 46$, $DE = 31$.

Задача L-30.5.

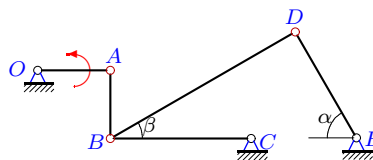
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$\varepsilon_{OA} = [3, 3.2, 3.5, 3.9]$,
 $\omega_{OA} = 2$, $\alpha = 60^\circ$, $\beta = 30^\circ$, $OA = 16$,
 $AB = 15$, $BC = 31$, $BD = 47$, $DE = 27$.

Задача L-30.6.

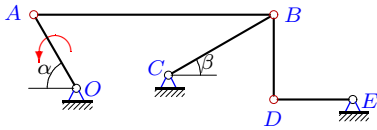
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$\varepsilon_{OA} = [3, 3.2, 3.6, 4.1]$,
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 $AB = 15$, $BC = 31$, $BD = 47$, $DE = 27$.

Задача L-30.7.

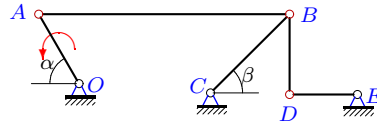
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$\varepsilon_{OA} = [4, 4.3, 4.7, 5.1],$
 $\omega_{OA}=4, \alpha=60^\circ, \beta=30^\circ, OA=28,$
 $AB=79, BC=40, BD=28, DE=26.$

Задача L-30.8.

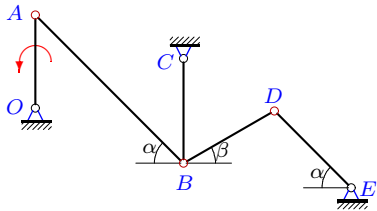
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$\varepsilon_{OA} = [3, 3.2, 3.5, 3.9],$
 $\omega_{OA}=2, \alpha=60^\circ, \beta=45^\circ, OA=26,$
 $AB=81, BC=36, BD=26, DE=22.$

Задача L-30.9.

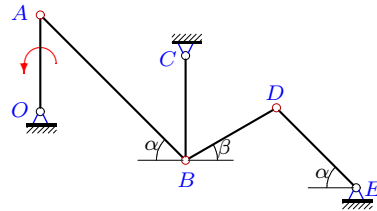
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$\varepsilon_{OA} = [2, 2.2, 2.5, 2.9],$
 $\omega_{OA}=3, \alpha=45^\circ, \beta=30^\circ, OA=24,$
 $AB=54, BC=27, BD=27, DE=28.$

Задача L-30.10.

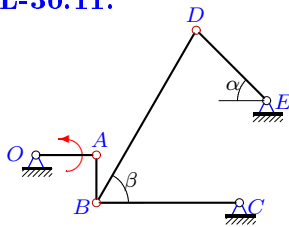
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$\varepsilon_{OA} = [2, 2.3, 2.6, 3.1],$
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 $AB=51, BC=26, BD=26, DE=28.$

Задача L-30.11.

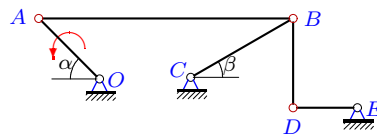
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$\varepsilon_{OA} = [2, 2.3, 2.7, 3.2],$
 $\omega_{OA}=1, \alpha=45^\circ, \beta=60^\circ, OA=14,$
 $AB=11, BC=33, BD=46, DE=23.$

Задача L-30.12.

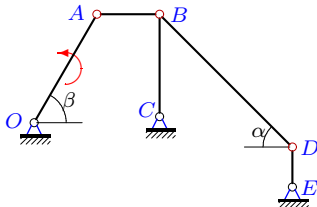
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$\varepsilon_{OA} = [2, 2.3, 2.7, 3.2],$
 $\omega_{OA}=1, \alpha=45^\circ, \beta=30^\circ, OA=24,$
 $AB=71, BC=33, BD=25, DE=18.$

Задача L-30.13.

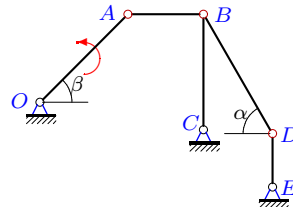
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$\varepsilon_{OA} = [1, 1.2, 1.5, 1.9],$
 $\omega_{OA}=4, \alpha=45^\circ, \beta=60^\circ, OA=22,$
 $AB=11, BC=18, BD=33, DE=7.$

Задача L-30.14.

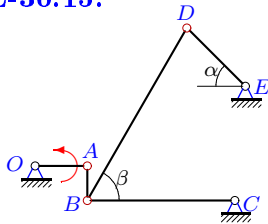
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$\varepsilon_{OA} = [4, 4.2, 4.6, 5.1],$
 $\omega_{OA}=2, \alpha=60^\circ, \beta=45^\circ, OA=28,$
 $AB=17, BC=26, BD=31, DE=12.$

Задача L-30.15.

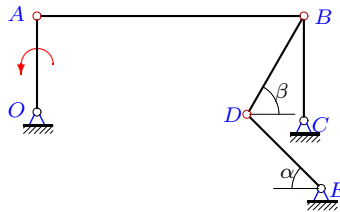
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$\varepsilon_{OA} = [1, 1.2, 1.5, 1.9]$,
 $\omega_{OA}=1$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=12$,
 $AB=8$, $BC=34$, $BD=46$, $DE=19$.

Задача L-30.16.

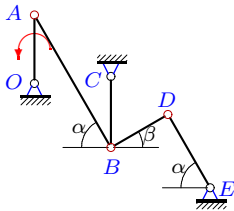
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$\varepsilon_{OA} = [1, 1.3, 1.6, 2]$,
 $\omega_{OA}=2$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=22$,
 $AB=61$, $BC=24$, $BD=26$, $DE=24$.

Задача L-30.17.

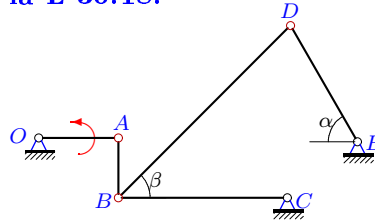
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$\varepsilon_{OA} = [3, 3.2, 3.6, 4.1]$,
 $\omega_{OA}=1$, $\alpha=60^\circ$, $\beta=30^\circ$, $OA=26$,
 $AB=58$, $BC=27$, $BD=25$, $DE=32$.

Задача L-30.18.

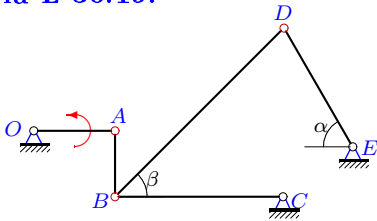
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$\varepsilon_{OA} = [3, 3.2, 3.5, 4]$,
 $\omega_{OA}=4$, $\alpha=60^\circ$, $\beta=45^\circ$, $OA=16$,
 $AB=12$, $BC=34$, $BD=49$, $DE=27$.

Задача L-30.19.

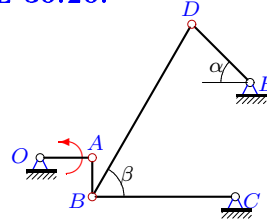
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$\varepsilon_{OA} = [3, 3.2, 3.6, 4]$,
 $\omega_{OA}=2$, $\alpha=60^\circ$, $\beta=45^\circ$, $OA=16$,
 $AB=13$, $BC=33$, $BD=47$, $DE=27$.

Задача L-30.20.

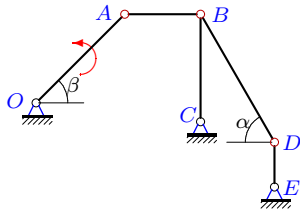
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$\varepsilon_{OA} = [1, 1.2, 1.5, 1.9]$,
 $\omega_{OA}=1$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=12$,
 $AB=9$, $BC=33$, $BD=46$, $DE=19$.

Задача L-30.21.

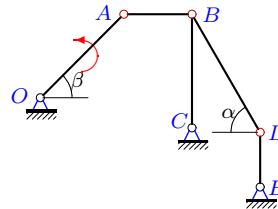
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$\varepsilon_{OA} = [4, 4.2, 4.6, 5]$,
 $\omega_{OA}=4$, $\alpha=60^\circ$, $\beta=45^\circ$, $OA=28$,
 $AB=17$, $BC=24$, $BD=33$, $DE=10$.

Задача L-30.22.

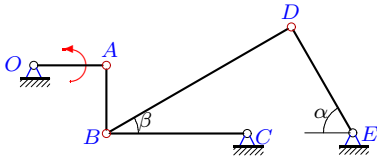
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$\varepsilon_{OA} = [3, 3.2, 3.5, 4]$,
 $\omega_{OA}=1$, $\alpha=60^\circ$, $\beta=45^\circ$, $OA=26$,
 $AB=15$, $BC=25$, $BD=30$, $DE=12$.

Задача L-30.23.

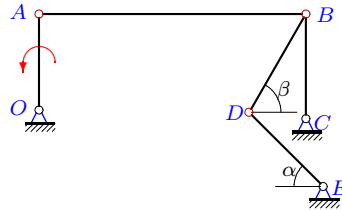
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$\varepsilon_{OA} = [3, 3.2, 3.6, 4.1]$,
 $\omega_{OA}=2$, $\alpha=60^\circ$, $\beta=30^\circ$, $OA=16$,
 $AB=15$, $BC=31$, $BD=47$, $DE=27$.

Задача L-30.24.

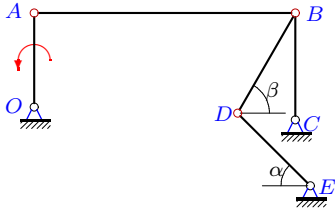
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$\varepsilon_{OA} = [1, 1.3, 1.7, 2.2]$,
 $\omega_{OA}=2$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=22$,
 $AB=61$, $BC=24$, $BD=26$, $DE=24$.

Задача L-30.25.

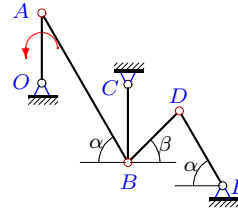
2



$\varepsilon_{OA} = [1, 1.3, 1.6, 2]$,
 $\omega_{OA}=3$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=22$,
 $AB=61$, $BC=25$, $BD=27$, $DE=24$.

Задача L-30.26.

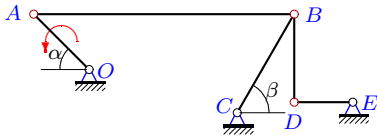
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$\varepsilon_{OA} = [3, 3.2, 3.6, 4.1]$,
 $\omega_{OA}=3$, $\alpha=60^\circ$, $\beta=45^\circ$, $OA=26$,
 $AB=64$, $BC=29$, $BD=27$, $DE=32$.

Задача L-30.27.

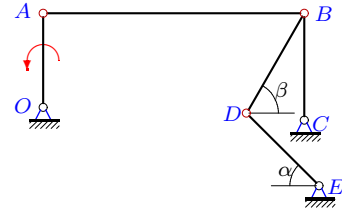
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$\varepsilon_{OA} = [2, 2.3, 2.7, 3.2]$,
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 $AB=80$, $BC=35$, $BD=27$, $DE=18$.

Задача L-30.28.

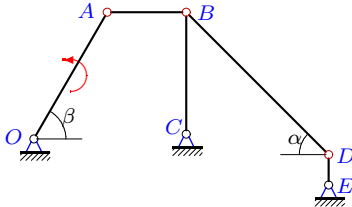
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$\varepsilon_{OA} = [1, 1.2, 1.6, 2]$,
 $\omega_{OA}=3$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=22$,
 $AB=61$, $BC=25$, $BD=27$, $DE=24$.

Задача L-30.29.

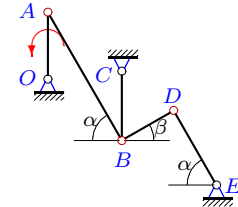
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$\varepsilon_{OA} = [2, 2.2, 2.5, 3]$,
 $\omega_{OA}=4$, $\alpha=45^\circ$, $\beta=60^\circ$, $OA=24$,
 $AB=13$, $BC=20$, $BD=33$, $DE=5$.

Задача L-30.30.

2



$\varepsilon_{OA} = [4, 4.2, 4.5, 4.9]$,
 $\omega_{OA}=1$, $\alpha=60^\circ$, $\beta=30^\circ$, $OA=28$,
 $AB=62$, $BC=29$, $BD=25$, $DE=36$.

Ответы.

Кинематика плоского механизма

22-Jan-16

						Математическое ожидание				
	ω_{OA}	ω_{AB}	ω_{BC}	ω_{BD}	ω_{DE}	ε_{OA}	ε_{AB}	ε_{BC}	ε_{BD}	ε_{DE}
1	2.000	0.000	-1.867	-1.077	1.347	4.400	7.340	8.395	-1.151	-6.673
2	1.000	0.000	-0.500	-0.301	-0.296	3.490	1.714	-1.745	-1.016	-1.136
3	1.000	0.336	0.579	0.622	-0.642	1.410	0.465	0.351	0.816	-0.436
4	1.000	0.000	-0.529	-0.351	-0.425	4.440	1.966	-2.351	-1.544	-1.972
5	2.000	0.000	-1.032	-0.590	-0.593	3.350	6.469	-1.729	-0.838	-1.447
6	2.000	0.000	-1.032	-0.590	-0.593	3.410	6.469	-1.760	-0.856	-1.465
7	4.000	2.835	4.850	3.464	-6.462	4.480	-6.717	-14.749	57.333	24.820
8	2.000	0.877	1.769	1.732	-2.047	3.350	0.741	0.238	6.843	-0.200
9	3.000	0.000	-2.667	-1.952	2.305	2.350	10.685	13.022	-2.400	-9.579
10	2.000	0.000	-1.846	-1.351	1.537	2.440	5.119	4.848	-2.069	-3.286
11	1.000	0.000	-0.424	-0.223	-0.546	2.490	1.813	-1.056	-0.601	-1.470
12	1.000	0.653	1.029	0.679	-1.633	2.490	1.206	1.535	4.143	-2.108
13	4.000	-4.000	4.234	0.000	10.887	1.350	-2.971	20.984	-21.730	126.396
14	2.000	-2.329	1.523	-0.000	3.300	4.410	-4.025	9.952	-4.539	31.718
15	1.000	0.000	-0.353	-0.191	-0.566	1.350	2.029	-0.476	-0.318	-0.874
16	2.000	0.000	1.833	1.239	0.949	1.430	0.120	1.311	-0.114	1.729
17	1.000	0.000	-0.963	-0.520	0.704	3.410	1.760	-0.010	-1.506	-0.173
18	4.000	0.000	-1.882	-1.171	-1.735	3.360	31.373	-1.581	-1.061	-2.954
19	2.000	0.000	-0.970	-0.610	-0.868	3.400	7.310	-1.648	-1.044	-1.846
20	1.000	0.000	-0.364	-0.191	-0.566	1.350	1.818	-0.491	-0.316	-0.878
21	4.000	-4.659	3.300	-0.000	7.920	4.400	-1.863	32.202	-22.174	140.654
22	1.000	-1.226	0.735	-0.000	1.532	3.360	-3.794	4.108	-0.976	10.672
23	2.000	0.000	-1.032	-0.590	-0.593	3.410	6.469	-1.760	-0.856	-1.465
24	2.000	0.000	1.833	1.239	0.949	1.490	0.120	1.366	-0.076	1.758
25	3.000	0.000	2.640	1.789	1.424	1.430	0.390	1.258	-1.148	2.915
26	3.000	0.000	-2.690	-1.495	1.784	3.410	13.869	23.449	2.763	-19.255
27	3.000	1.004	1.680	1.886	-1.633	2.490	0.797	-2.614	0.672	1.959
28	3.000	0.000	2.640	1.789	1.424	1.400	0.390	1.232	-1.166	2.901
29	4.000	-3.692	4.157	0.000	16.628	2.360	-3.182	20.914	-44.432	291.016
30	1.000	0.000	-0.966	-0.560	0.674	4.350	1.775	-0.913	-2.119	0.479

L-30 файл о30L2A