

Механизм с двумя степенями свободы

В указанном положении механизма заданы угловые скорости двух его звеньев. Длины звеньев даны в сантиметрах. Стержни, направление которых не указано, считать горизонтальными или вертикальными. Найти угловые скорости всех звеньев механизма.

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

Задача 25.1.

$\omega_{OA_z} = -12\frac{1}{c}$, $\omega_{DE_z} = 36\frac{1}{c}$, $AB = 9$, $BC = 4$,
 $DE = 3$, $OA = 3$, $CF = 3$, $BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.3.

$\omega_{OA_z} = 6\frac{1}{c}$, $\omega_{CF_z} = 12\frac{1}{c}$, $AB = 4$, $BC = 3$,
 $DE = 2$, $OA = 2$, $CF = 2$, $BD = 2\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.5.

$\omega_{OA_z} = -4\frac{1}{c}$, $\omega_{CF_z} = 4\frac{1}{c}$, $AB = 9$, $BC = 4$,
 $DE = 3$, $CF = 3$, $OA = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.7.

$\omega_{OA_z} = -2\frac{1}{c}$, $\omega_{DE_z} = 6\frac{1}{c}$, $AB = 8$, $BC = 4$,
 $DE = 2$, $OA = 2$, $CF = 2$, $BD = 2\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.2.

$\omega_{OA_z} = -2\frac{1}{c}$, $\omega_{DE_z} = 6\frac{1}{c}$, $AB = 3$, $BC = 2$,
 $DE = 3$, $OA = CF = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.4.

$\omega_{CF_z} = \omega_{DE_z} = 10\frac{1}{c}$, $AB = 10$, $BC = 5$,
 $DE = 3$, $OA = CF = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.6.

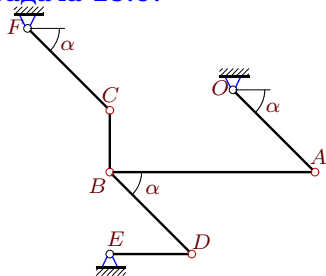
$\omega_{OA_z} = 1\frac{1}{c}$, $\omega_{CF_z} = 2\frac{1}{c}$, $AB = 3$, $BC = 3$,
 $DE = 3$, $CF = 3$, $OA = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.8.

$\omega_{OA_z} = \omega_{CF_z} = 12\frac{1}{c}$, $AB = 8$, $BC = 3$,
 $DE = 2$, $OA = 2$, $CF = BD = 2\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.9.

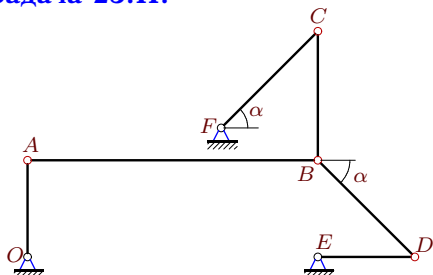
1



$\omega_{OA_z} = \omega_{DE_z} = 15\frac{1}{c}$, $AB = 10$, $BC = 3$,
 $DE = 4$, $OA = CF = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.11.

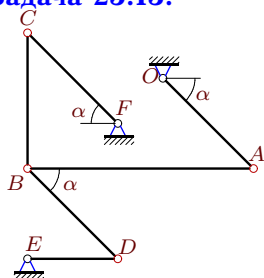
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$\omega_{CF_z} = 12\frac{1}{c}$, $\omega_{DE_z} = -4\frac{1}{c}$, $AB = 9$, $BC = 4$,
 $DE = 3$, $OA = 3$, $CF = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.13.

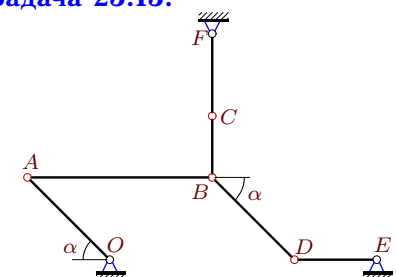
1



$\omega_{OA_z} = -5\frac{1}{c}$, $\omega_{DE_z} = 15\frac{1}{c}$, $AB = 10$, $BC = 6$,
 $DE = 4$, $OA = CF = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.15.

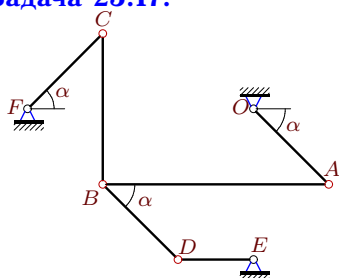
1



$\omega_{OA_z} = \omega_{CF_z} = 9\frac{1}{c}$, $AB = 9$, $BC = 3$,
 $DE = 4$, $CF = 4$, $OA = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.17.

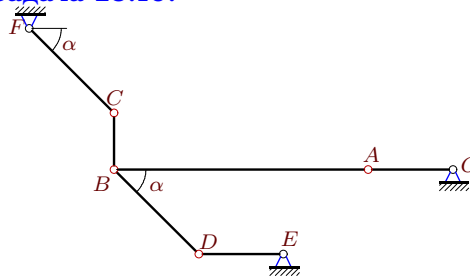
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$\omega_{CF_z} = 12\frac{1}{c}$, $\omega_{DE_z} = -6\frac{1}{c}$, $AB = 9$, $BC = 6$,
 $DE = 3$, $OA = CF = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.10.

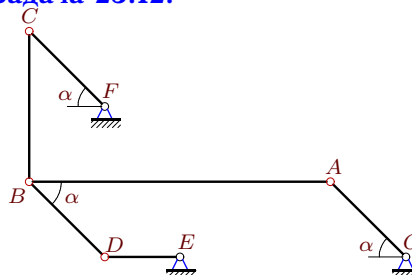
1



$\omega_{OA_z} = \omega_{CF_z} = -6\frac{1}{c}$, $AB = 9$, $BC = 2$,
 $DE = 3$, $OA = 3$, $CF = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.12.

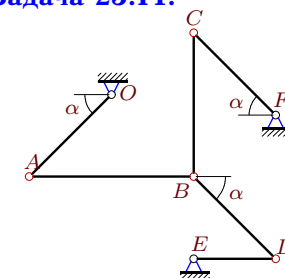
1



$\omega_{OA_z} = -4\frac{1}{c}$, $\omega_{CF_z} = 8\frac{1}{c}$, $AB = 8$, $BC = 4$,
 $DE = 2$, $OA = CF = BD = 2\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.14.

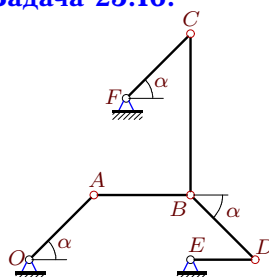
1



$\omega_{OA_z} = -14\frac{1}{c}$, $\omega_{CF_z} = 28\frac{1}{c}$, $AB = 8$, $BC = 7$,
 $DE = 4$, $OA = CF = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.16.

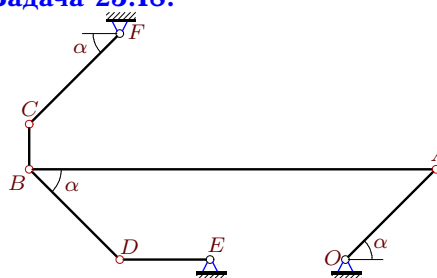
1



$\omega_{OA_z} = 15\frac{1}{c}$, $\omega_{DE_z} = 45\frac{1}{c}$, $AB = 3$, $BC = 5$,
 $DE = 2$, $OA = CF = BD = 2\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.18.

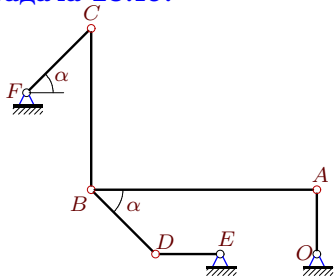
1



$\omega_{CF_z} = -3\frac{1}{c}$, $\omega_{DE_z} = 3\frac{1}{c}$, $AB = 9$, $BC = 1$,
 $DE = 2$, $OA = CF = BD = 2\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.19.

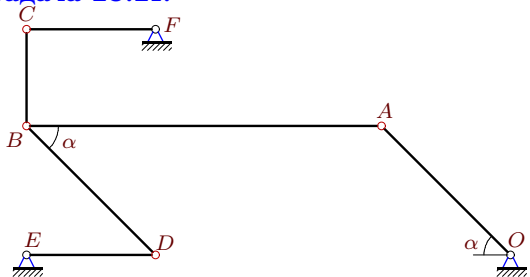
1



$$\omega_{CF_z} = -21\frac{1}{c}, \omega_{DE_z} = 7\frac{1}{c}, AB = 7, BC = 5, DE = 2, OA = 2, CF = BD = 2\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.21.

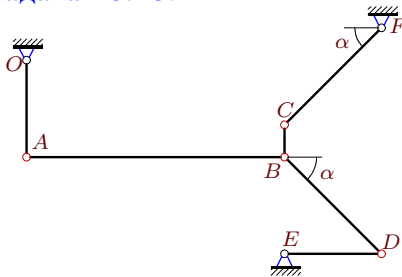
1



$$\omega_{OA_z} = -33\frac{1}{c}, \omega_{DE_z} = -99\frac{1}{c}, AB = 11, BC = 3, DE = 4, CF = 4, OA = BD = 4\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.23.

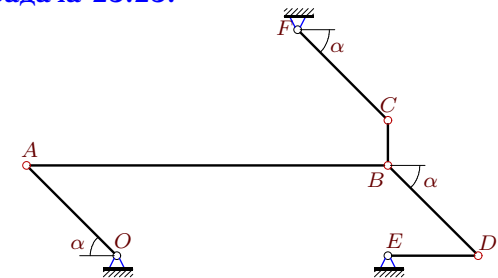
1



$$\omega_{CF_z} = -8\frac{1}{c}, \omega_{DE_z} = 8\frac{1}{c}, AB = 8, BC = 1, DE = 3, OA = 3, CF = BD = 3\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.25.

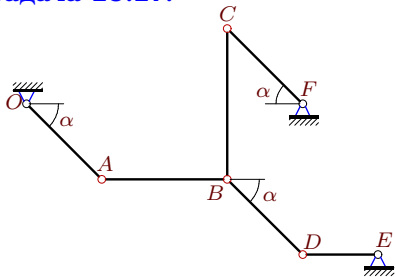
1



$$\omega_{CF_z} = -12\frac{1}{c}, \omega_{DE_z} = -4\frac{1}{c}, AB = 8, BC = 1, DE = 2, OA = CF = BD = 2\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.27.

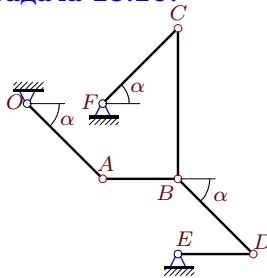
1



$$\omega_{CF_z} = 30\frac{1}{c}, \omega_{DE_z} = 10\frac{1}{c}, AB = 5, BC = 6, DE = 3, OA = CF = BD = 3\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.20.

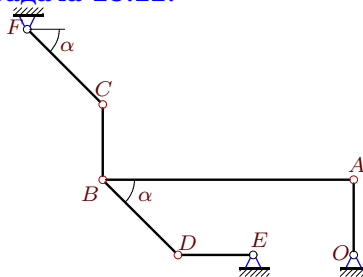
1



$$\omega_{CF_z} = -6\frac{1}{c}, \omega_{DE_z} = 2\frac{1}{c}, AB = 3, BC = 6, DE = 3, OA = CF = BD = 3\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.22.

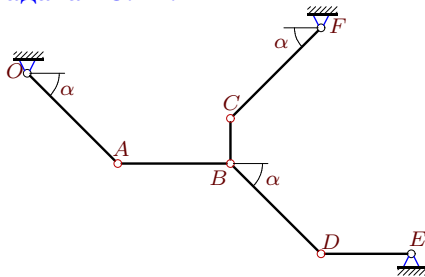
1



$$\omega_{OA_z} = -10\frac{1}{c}, \omega_{CF_z} = -30\frac{1}{c}, AB = 10, BC = 3, DE = 3, OA = 3, CF = BD = 3\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.24.

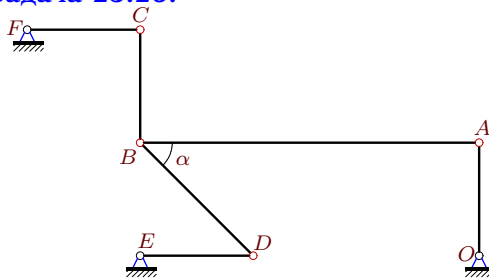
1



$$\omega_{OA_z} = 1\frac{1}{c}, \omega_{CF_z} = -1\frac{1}{c}, AB = 5, BC = 2, DE = 4, OA = CF = BD = 4\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.26.

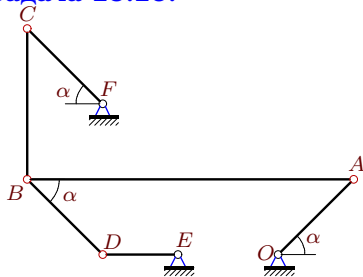
1



$$\omega_{OA_z} = 3\frac{1}{c}, \omega_{CF_z} = 6\frac{1}{c}, AB = 9, BC = 3, DE = 3, OA = 3, CF = 3, BD = 3\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.28.

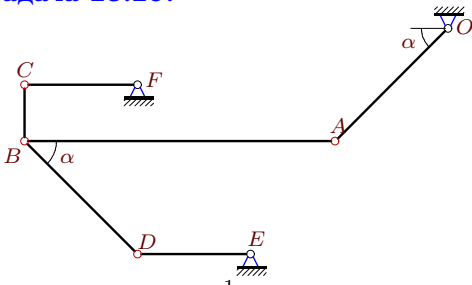
1



$$\omega_{CF_z} = -26\frac{1}{c}, \omega_{DE_z} = 26\frac{1}{c}, AB = 13, BC = 6, DE = 3, OA = CF = BD = 3\sqrt{2}, \alpha = 45^\circ.$$

Задача 25.29.

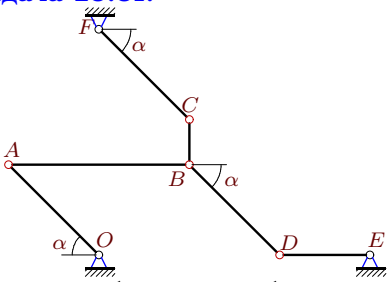
1



$\omega_{CF_z} = \omega_{DE_z} = 11\frac{1}{c}$, $AB = 11$, $BC = 2$,
 $DE = 4$, $CF = 4$, $OA = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.31.

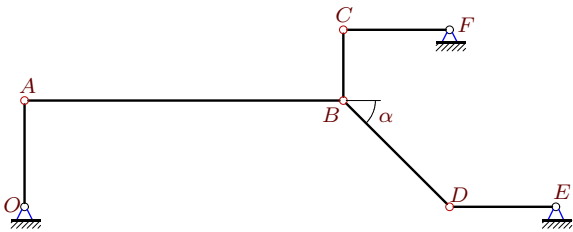
1



$\omega_{OA_z} = -2\frac{1}{c}$, $\omega_{DE_z} = 6\frac{1}{c}$, $AB = 8$, $BC = 2$,
 $DE = 4$, $OA = CF = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.33.

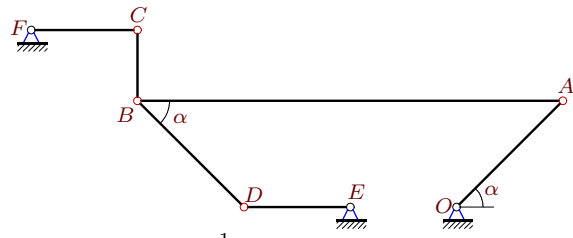
1



$\omega_{CF_z} = \omega_{DE_z} = -3\frac{1}{c}$, $AB = 9$, $BC = 2$,
 $DE = 3$, $OA = 3$, $CF = 3$, $BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.30.

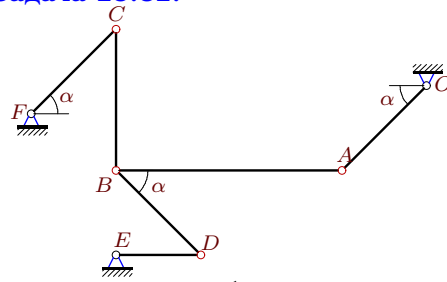
1



$\omega_{OA_z} = \omega_{DE_z} = 4\frac{1}{c}$, $AB = 12$, $BC = 2$,
 $DE = 3$, $CF = 3$, $OA = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.32.

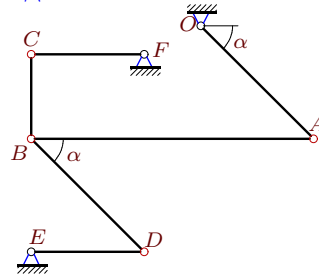
1



$\omega_{OA_z} = \omega_{CF_z} = 20\frac{1}{c}$, $AB = 8$, $BC = 5$,
 $DE = 3$, $OA = CF = BD = 3\sqrt{2}$, $\alpha = 45^\circ$.

Задача 25.34.

1



$\omega_{OA_z} = \omega_{DE_z} = -15\frac{1}{c}$, $AB = 10$, $BC = 3$,
 $DE = 4$, $CF = 4$, $OA = BD = 4\sqrt{2}$, $\alpha = 45^\circ$.

Механизм с двумя степенями свободы

№	ω_{OA}	ω_{AB}	ω_{BC}	ω_{FC}	ω_{DB}	ω_{DE}
1	—	16	9	48	-12	—
2	—	10	-9	8	-2	—
3	—	-3	-8	—	0	0
4	0	-3	6	—	0	—
5	—	0	-3	—	4	0
6	—	1	-1	—	1	-3
7	—	-1	1	-4	-2	—
8	—	-3	-16	—	12	24
9	—	-6	-20	30	-15	—
10	—	4	9	—	0	6
11	-16	4	21	—	-16	—
12	—	3	6	—	-4	12
13	—	-6	-10	-10	5	—
14	—	-21	8	—	14	-14
15	—	4	-24	—	9	-9
16	—	10	6	30	15	—
17	6	-2	9	—	-6	—
18	-6	-2	18	—	-6	—
19	14	6	-14	—	14	—
20	-8	2	-7	—	8	—
21	—	36	44	66	-33	—
22	—	9	40	—	-10	40
23	0	3	24	—	0	—
24	—	0	4	—	-1	0
25	8	-1	8	—	8	—
26	—	-2	-3	—	3	9
27	-20	-6	5	—	20	—
28	-52	-18	13	—	-52	—
29	0	4	0	—	0	—
30	—	3	-6	-8	4	—
31	—	-3	12	-4	-2	—
32	—	-15	24	—	-20	0
33	0	1	0	—	0	—
34	—	6	-20	30	15	—