

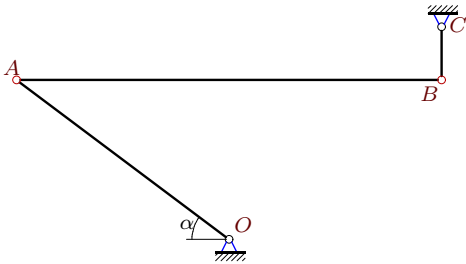
# Кинематический анализ механизма. Угловые ускорения

В указанном положении механизма задана постоянная угловая скорость звена  $OA$ . Длины звеньев даны в сантиметрах. Звенья, направление которых не указано, принимать вертикальными или горизонтальными. Найти угловые ускорения звеньев  $AB$  и  $BC$ .

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

## Задача 24.1.

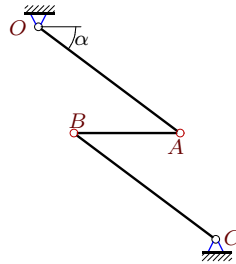
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$\omega_{OAz} = 8$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 8$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 3/4$ .

## Задача 24.2.

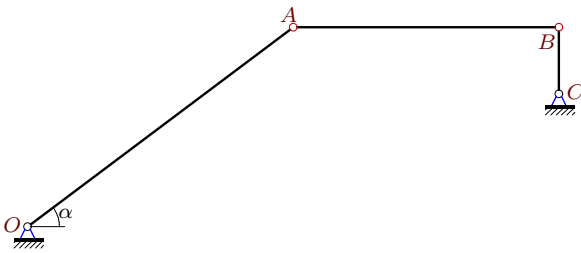
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$\omega_{OAz} = 3$  рад/с,  $OA \parallel BC$ ,  
 $OA = 5$ ,  $AB = 3$ ,  $BC = 5$ ,  $\operatorname{tg} \alpha = 3/4$ .

## Задача 24.3.

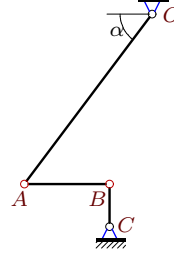
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$\omega_{OAz} = 4$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 4$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 3/4$ .

## Задача 24.4.

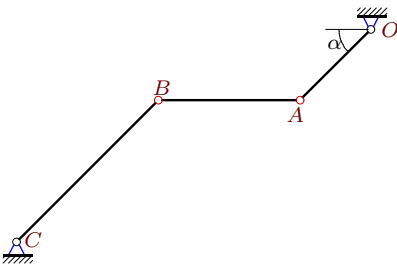
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$\omega_{OAz} = 2$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 2$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 4/3$ .

## Задача 24.5.

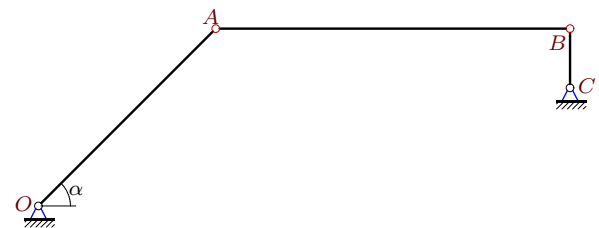
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$\omega_{OAz} = 28$  рад/с,  $OA \parallel BC$ ,  
 $OA = 7\sqrt{2}$ ,  $AB = 14$ ,  $BC = 14\sqrt{2}$ ,  $\alpha = \pi/4$ .

## Задача 24.6.

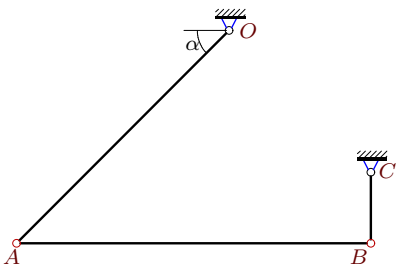
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$\omega_{OAz} = 6$  рад/с,  $AB \perp BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 6$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

## Задача 24.7.

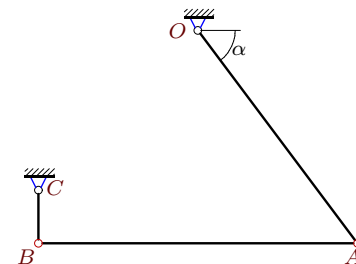
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$\omega_{OAz} = 5$  рад/с,  $AB \perp BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 5$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

## Задача 24.8.

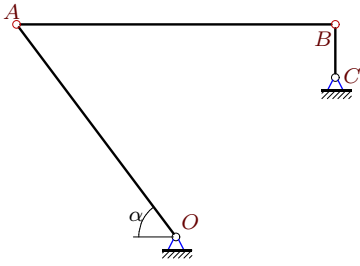
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$\omega_{OAz} = -6$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 6$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 4/3$ .

**Задача 24.9.**

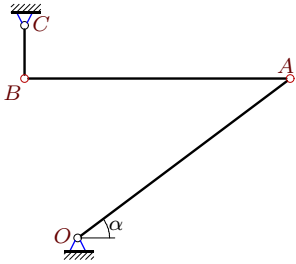
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$\omega_{OAz} = 6$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 6$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 4/3$ .

**Задача 24.11.**

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$\omega_{OAz} = -5$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 5$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 3/4$ .

**Задача 24.13.**

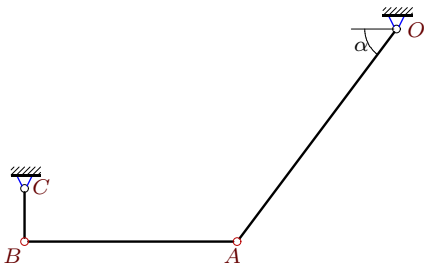
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$\omega_{OAz} = 10$  рад/с,  $AB \perp BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 10$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

**Задача 24.15.**

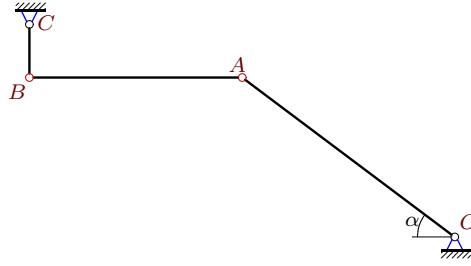
9



$\omega_{OAz} = -4$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 4$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 4/3$ .

**Задача 24.10.**

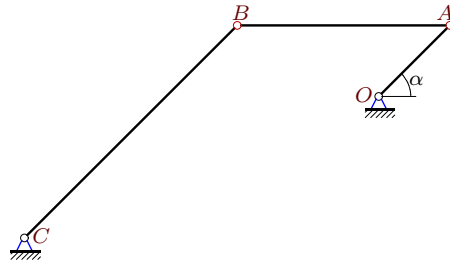
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$\omega_{OAz} = -4$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 4$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 3/4$ .

**Задача 24.12.**

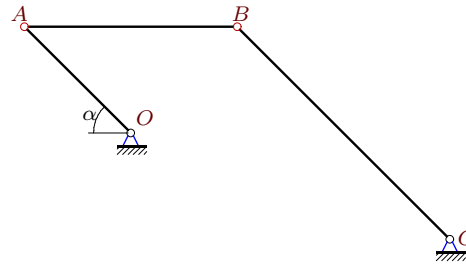
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$\omega_{OAz} = -27$  рад/с,  $OA \parallel BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 9$ ,  $BC = 9\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.14.**

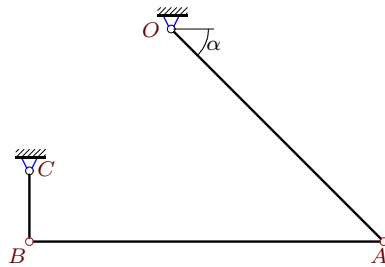
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$\omega_{OAz} = 16$  рад/с,  $OA \parallel BC$ ,  
 $OA = 4\sqrt{2}$ ,  $AB = 8$ ,  $BC = 8\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.16.**

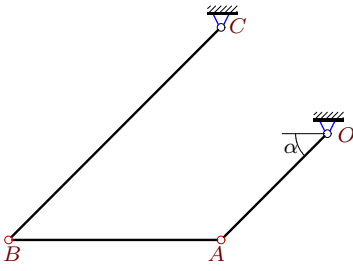
9



$\omega_{OAz} = -5$  рад/с,  $AB \perp BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 5$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

**Задача 24.17.**

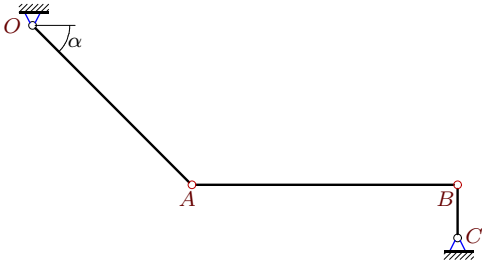
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$\omega_{OAz} = -24$  рад/с,  $OA \parallel BC$ ,  
 $OA = 6\sqrt{2}$ ,  $AB = 12$ ,  $BC = 12\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.19.**

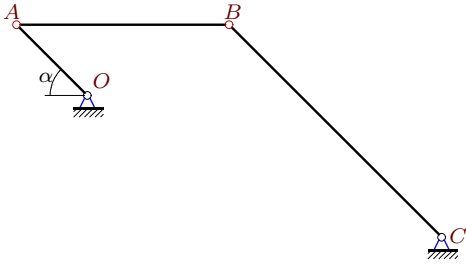
9



$\omega_{OAz} = 5$  рад/с,  $AB \perp BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 5$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

**Задача 24.21.**

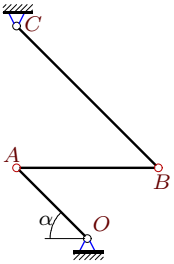
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$\omega_{OAz} = 45$  рад/с,  $OA \parallel BC$ ,  
 $OA = 5\sqrt{2}$ ,  $AB = 15$ ,  $BC = 15\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.23.**

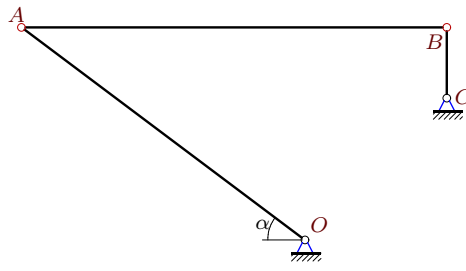
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$\omega_{OAz} = -8$  рад/с,  $OA \parallel BC$ ,  
 $OA = 2\sqrt{2}$ ,  $AB = 4$ ,  $BC = 4\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.18.**

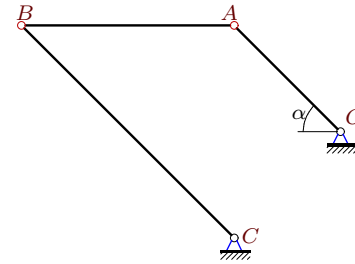
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$\omega_{OAz} = 6$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 6$ ,  $BC = 1$ ,  $\text{tg } \alpha = 3/4$ .

**Задача 24.20.**

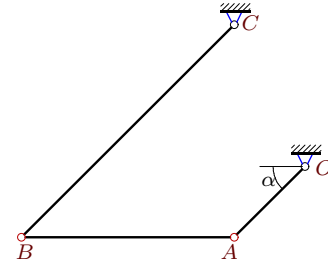
9



$\omega_{OAz} = -20$  рад/с,  $OA \parallel BC$ ,  
 $OA = 5\sqrt{2}$ ,  $AB = 10$ ,  $BC = 10\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.22.**

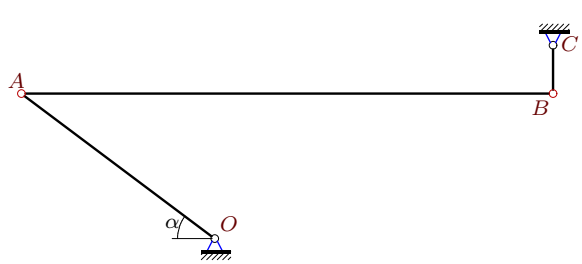
9



$\omega_{OAz} = -63$  рад/с,  $OA \parallel BC$ ,  
 $OA = 7\sqrt{2}$ ,  $AB = 21$ ,  $BC = 21\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.24.**

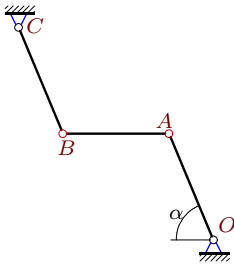
9



$\omega_{OAz} = 11$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 11$ ,  $BC = 1$ ,  $\text{tg } \alpha = 3/4$ .

**Задача 24.25.**

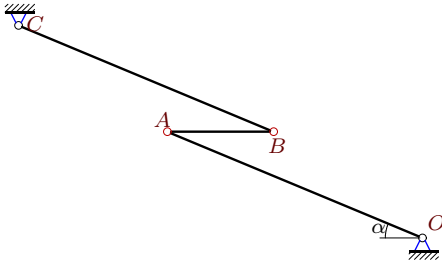
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$\omega_{OAz} = 12$  рад/с,  $OA \parallel BC$ ,  
 $OA = 13$ ,  $AB = 12$ ,  $BC = 13$ ,  $\operatorname{tg} \alpha = 12/5$ .

**Задача 24.27.**

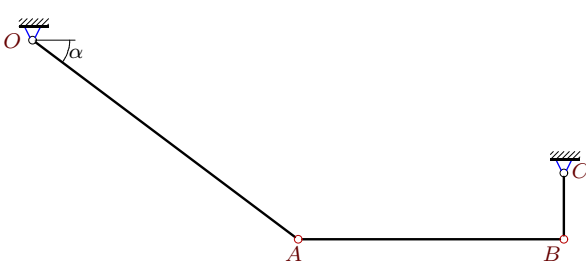
9



$\omega_{OAz} = -5$  рад/с,  $OA \parallel BC$ ,  
 $OA = 13$ ,  $AB = 5$ ,  $BC = 13$ ,  $\operatorname{tg} \alpha = 5/12$ .

**Задача 24.29.**

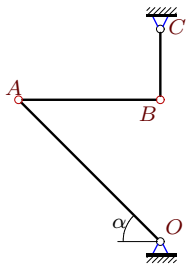
9



$\omega_{OAz} = 4$  рад/с,  $AB \perp BC$ ,  
 $OA = 5$ ,  $AB = 4$ ,  $BC = 1$ ,  $\operatorname{tg} \alpha = 3/4$ .

**Задача 24.31.**

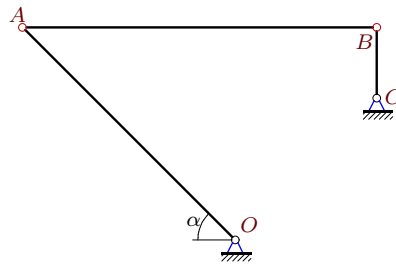
9



$\omega_{OAz} = 2$  рад/с,  $AB \perp BC$ ,  
 $OA = 2\sqrt{2}$ ,  $AB = 2$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

**Задача 24.26.**

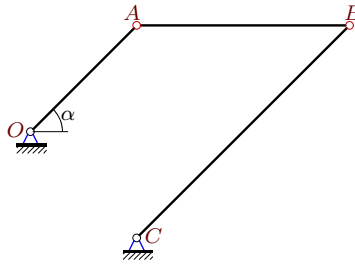
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$\omega_{OAz} = 5$  рад/с,  $AB \perp BC$ ,  
 $OA = 3\sqrt{2}$ ,  $AB = 5$ ,  $BC = 1$ ,  $\alpha = \pi/4$ .

**Задача 24.28.**

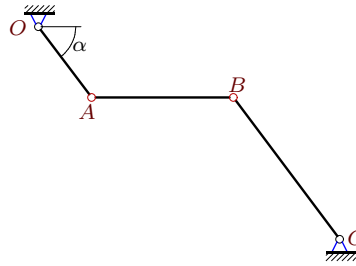
9



$\omega_{OAz} = 24$  рад/с,  $OA \parallel BC$ ,  
 $OA = 6\sqrt{2}$ ,  $AB = 12$ ,  $BC = 12\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Задача 24.30.**

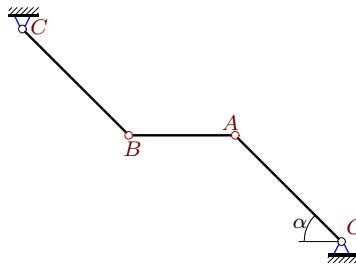
9



$\omega_{OAz} = -16$  рад/с,  $OA \parallel BC$ ,  
 $OA = 5$ ,  $AB = 8$ ,  $BC = 10$ ,  $\operatorname{tg} \alpha = 4/3$ .

**Задача 24.32.**

9



$\omega_{OAz} = 6$  рад/с,  $OA \parallel BC$ ,  
 $OA = 6\sqrt{2}$ ,  $AB = 6$ ,  $BC = 6\sqrt{2}$ ,  $\alpha = \pi/4$ .

**Кинематический анализ механизма. Угловые ускорения**

№	$\omega_{ABz}$	$\omega_{BCz}$	$\varepsilon_{AB}$	$\varepsilon_{BC}$
1	4	-24	96	128
2	0	-3	50	24
3	-4	12	24	128
4	3	-8	40	6
5	0	-14	1176	588
6	-3	18	36	162
7	3	15	30	30
8	-3	-24	72	54
9	3	24	72	54
10	4	12	48	128
11	-4	15	60	20
12	0	-9	324	162
13	-3	-30	120	390
14	0	8	128	64
15	3	-16	48	84
16	-3	-15	30	30
17	0	-12	288	144
18	4	18	36	48
19	-3	-15	60	120
20	0	-10	200	100
21	0	15	900	450
22	0	-21	1764	882
23	0	4	96	48
24	4	-33	132	308
25	0	-12	338	120
26	3	15	30	30
27	0	5	338	120
28	0	12	288	144
29	-4	12	24	128
30	0	8	300	144
31	2	-4	12	0
32	0	-6	144	72