

## Кинематический анализ механизма (5 звеньев)

В указанном положении механизма задана угловая скорость одного из его звеньев. Длины звеньев даны в сантиметрах. Стержни, направление которых не указано, считать вертикальными или горизонтальными. Найти угловые скорости звеньев механизма.

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

**Задача 23.1.** 3

$\omega_{OA} = 240 \text{ рад/с}, OA = 5, AB = 6, BC = 5, DE = 4, BD = 5, \cos \alpha = 0.8, \cos \beta = 0.6.$

**Задача 23.2.** 3

$\omega_{OA} = 30 \text{ рад/с}, OA = 5, AB = 6, BC = 2, DE = 5, BD = 3\sqrt{2}, \cos \alpha = 0.8, \beta = 45^\circ.$

**Задача 23.3.** 3

$\omega_{OA} = 10 \text{ рад/с}, OA = 6, DF = 15, BC = CF = 5, AB = 4\sqrt{2}, DE = 3, \cos \alpha = 0.8, CB \perp CF.$

**Задача 23.4.** 3

$\omega_{OA} = 10 \text{ рад/с}, OA = 5, AB = 6, BC = 2, DE = 10, BD = 5\sqrt{2}, \cos \alpha = 0.6, \beta = 45^\circ.$

**Задача 23.5.** 3

$\omega_{OA} = 40 \text{ рад/с}, OA = 5, AB = 8, BC = 2, DE = 10, BD = 4\sqrt{2}, \cos \alpha = 0.6, \beta = 45^\circ.$

**Задача 23.6.** 3

$\omega_{OA} = 20 \text{ рад/с}, OA = 5, AB = 12, BC = 2, DE = 10, BD = 5, \cos \alpha = 0.6, \cos \beta = 0.6.$

**Задача 23.7.** 3

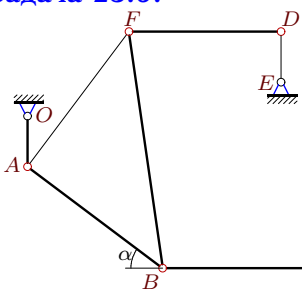
$\omega_{OA} = 8 \text{ рад/с}, OA = 5, AB = 8, BC = 2, DE = 4, BD = 5, \cos \alpha = 0.6, \cos \beta = 0.6.$

**Задача 23.8.** 3

$\omega_{OA} = 60 \text{ рад/с}, OA = 5, AB = 12, BC = 4, DE = 10, BD = 6\sqrt{2}, \cos \alpha = 0.6, \beta = 45^\circ.$

**Задача 23.9.**

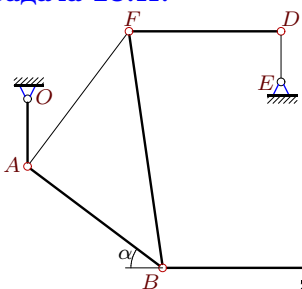
3



$\omega_{OA} = 30$  рад/с,  $OA = 3$ ,  $AB=AF=10$ ,  
 $BC = 10$ ,  $DF=9$ ,  $DE=3$ ,  $\cos \alpha=0.8$ ,  $AB \perp AF$ .

**Задача 23.11.**

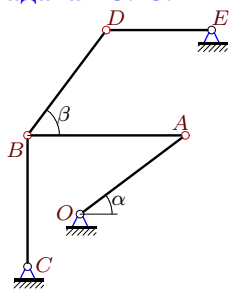
3



$\omega_{OA} = 27$  рад/с,  $OA = 4$ ,  $AB=AF=10$ ,  
 $BC = 9$ ,  $DF=9$ ,  $DE=3$ ,  $\cos \alpha=0.8$ ,  $AB \perp AF$ .

**Задача 23.13.**

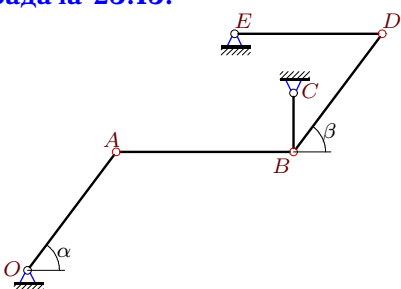
3



$\omega_{OA} = 240$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 5$ ,  
 $DE = 4$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.15.**

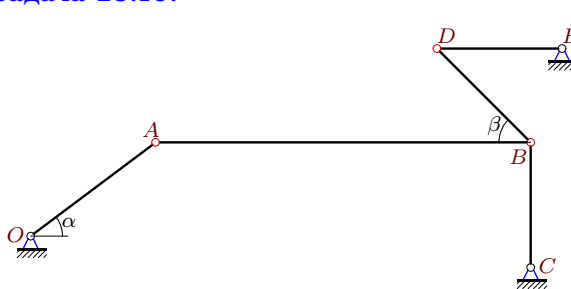
3



$\omega_{OA} = 10$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 2$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.6$ ,  $\cos \beta = 0.6$ .

**Задача 23.10.**

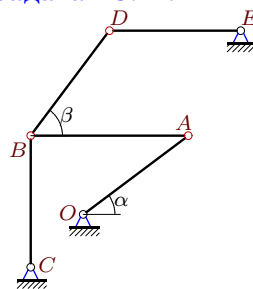
3



$\omega_{OA} = 12$  рад/с,  $OA = 5$ ,  $AB = 12$ ,  $BC = 4$ ,  
 $DE = 4$ ,  $BD = 3\sqrt{2}$ ,  $\cos \alpha = 0.8$ ,  $\beta = 45^\circ$ .

**Задача 23.12.**

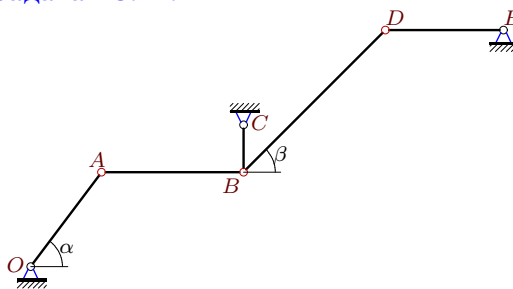
3



$\omega_{OA} = 60$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 5$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.14.**

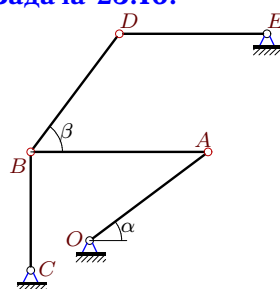
3



$\omega_{OA} = 30$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 2$ ,  
 $DE = 5$ ,  $BD = 6\sqrt{2}$ ,  $\cos \alpha = 0.6$ ,  $\beta = 45^\circ$ .

**Задача 23.16.**

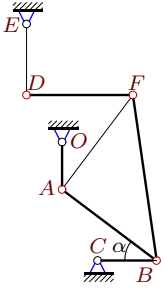
3



$\omega_{OA} = 60$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 4$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.17.**

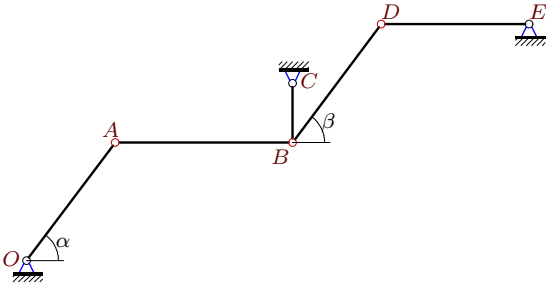
3



$\omega_{OA} = 45$  рад/с,  $OA = 4$ ,  $AB=AF=10$ ,  
 $BC = 5$ ,  $DF=9$ ,  $DE=6$ ,  $\cos \alpha=0.8$ ,  $AB \perp AF$ .

**Задача 23.19.**

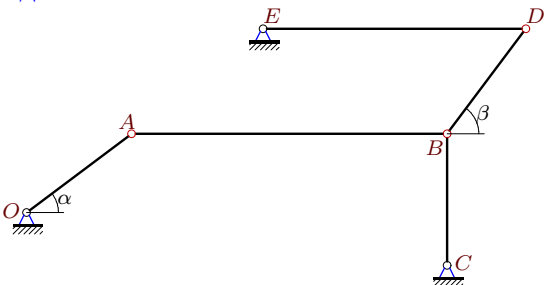
3



$\omega_{OA} = 10$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 2$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.6$ ,  $\cos \beta = 0.6$ .

**Задача 23.21.**

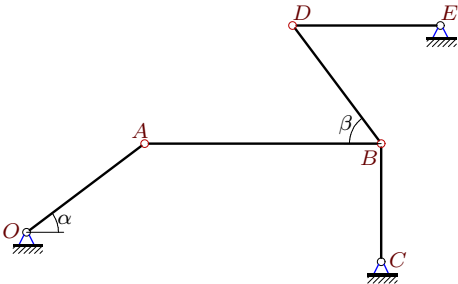
3



$\omega_{OA} = 120$  рад/с,  $OA = 5$ ,  $AB = 12$ ,  $BC = 5$ ,  
 $DE = 10$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.23.**

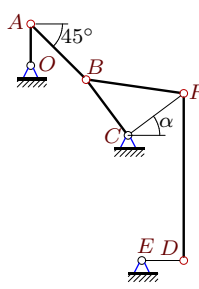
3



$\omega_{OA} = 20$  рад/с,  $OA = 5$ ,  $AB = 8$ ,  $BC = 4$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.18.**

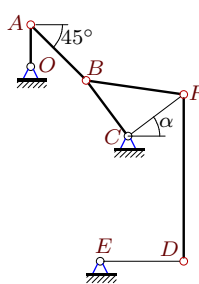
3



$\omega_{OA} = 4$  рад/с,  $OA = 3$ ,  $DF=12$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=3$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Задача 23.20.**

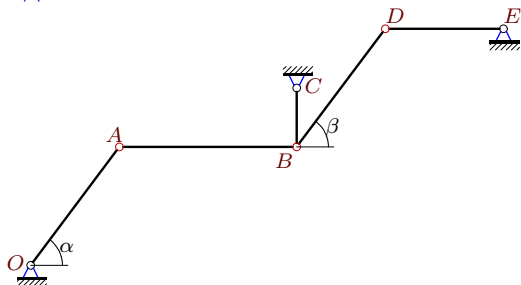
3



$\omega_{OA} = 4$  рад/с,  $OA = 3$ ,  $DF=12$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=6$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Задача 23.22.**

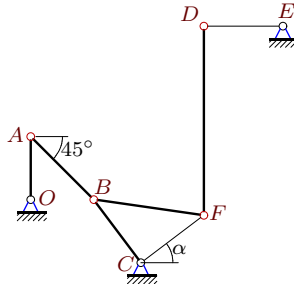
3



$\omega_{OA} = 4$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 2$ ,  
 $DE = 4$ ,  $BD = 5$ ,  $\cos \alpha = 0.6$ ,  $\cos \beta = 0.6$ .

**Задача 23.24.**

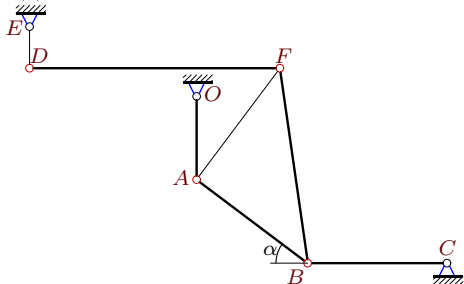
3



$\omega_{OA} = 5$  рад/с,  $OA = 4$ ,  $DF=12$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=5$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Задача 23.25.**

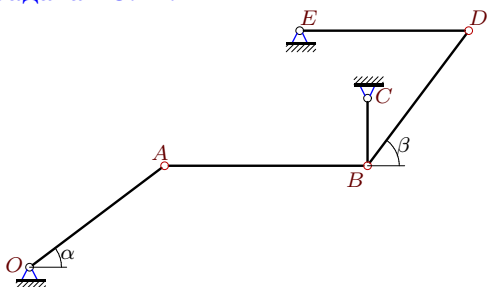
3



$\omega_{OA} = 15$  рад/с,  $OA = 6$ ,  $AB=AF=10$ ,  
 $BC = 10$ ,  $DF=18$ ,  $DE=3$ ,  $\cos \alpha=0.8$ ,  $AB \perp AF$ .

**Задача 23.27.**

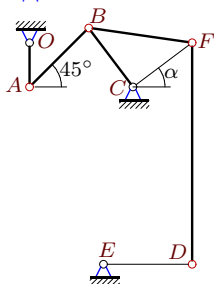
3



$\omega_{OA} = 60$  рад/с,  $OA = 5$ ,  $AB = 6$ ,  $BC = 2$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.29.**

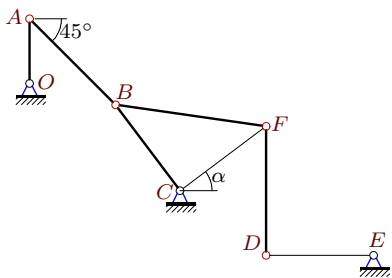
3



$\omega_{OA} = 140$  рад/с,  $OA = 3$ ,  $DF=15$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=6$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Задача 23.31.**

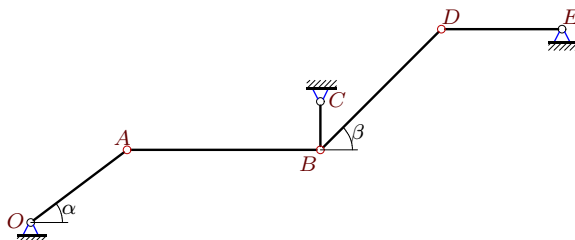
3



$\omega_{OA} = 20$  рад/с,  $OA = 3$ ,  $DF=6$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=5$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Задача 23.26.**

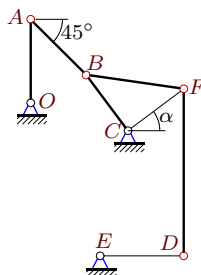
3



$\omega_{OA} = 10$  рад/с,  $OA = 5$ ,  $AB = 8$ ,  $BC = 2$ ,  
 $DE = 5$ ,  $BD = 5\sqrt{2}$ ,  $\cos \alpha = 0.8$ ,  $\beta = 45^\circ$ .

**Задача 23.28.**

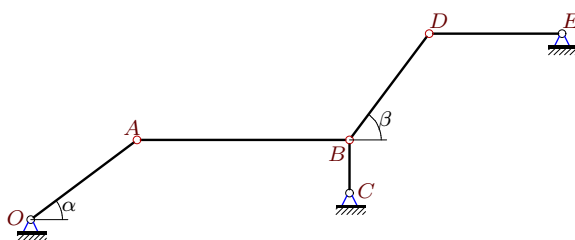
3



$\omega_{OA} = 2$  рад/с,  $OA = 6$ ,  $DF=12$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=6$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Задача 23.30.**

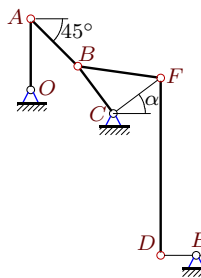
3



$\omega_{OA} = 20$  рад/с,  $OA = 5$ ,  $AB = 8$ ,  $BC = 2$ ,  
 $DE = 5$ ,  $BD = 5$ ,  $\cos \alpha = 0.8$ ,  $\cos \beta = 0.6$ .

**Задача 23.32.**

3



$\omega_{OA} = 10$  рад/с,  $OA = 6$ ,  $DF=15$ ,  $BC=CF=5$ ,  
 $AB = 4\sqrt{2}$ ,  $DE=3$ ,  $\cos \alpha=0.8$ ,  $CB \perp CF$ .

**Кинематический анализ механизма (5 звеньев)**

№	$\omega_{AB}$	$\omega_{BC}$	$\omega_{DB}$	$\omega_{DF}$	$\omega_{DE}$
1	160	144	180	—	135
2	20	45	30	—	18
3	45	60	—	12	80
4	5	20	8	—	4
5	15	80	40	—	16
6	5	40	20	—	6
7	3	16	8	—	6
8	15	60	40	—	24
9	15	12	—	10	70
10	4	9	12	—	9
11	18	16	—	12	84
12	40	36	45	—	27
13	160	144	180	—	135
14	15	60	20	—	24
15	5	20	10	—	6
16	40	45	45	—	27
17	30	48	—	20	70
18	9	12	—	3	16
19	5	20	10	—	6
20	9	12	—	3	8
21	40	72	90	—	27
22	2	8	4	—	3
23	10	15	15	—	9
24	15	20	—	5	16
25	15	12	—	5	70
26	5	15	6	—	6
27	40	90	45	—	27
28	9	12	—	3	8
29	45	60	—	12	40
30	10	30	15	—	9
31	45	60	—	30	48
32	45	60	—	12	80