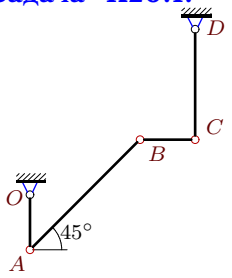
Уравнение трех угловых ускорений. Две степени свободы

В указанном положении механизма заданы угловые скорости и ускорения двух звеньев. Длины звеньев даны в сантиметрах. Звенья, направление которых не указано, принимать вертикальными или горизонтальными. Найти угловые ускорения звеньев механизма.

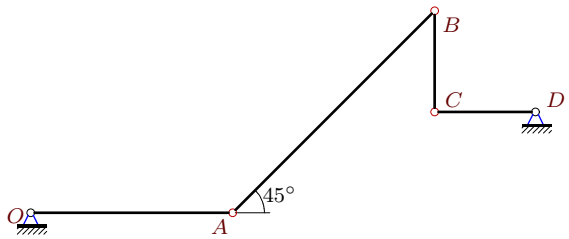
Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.183.)

Задача К20.1.



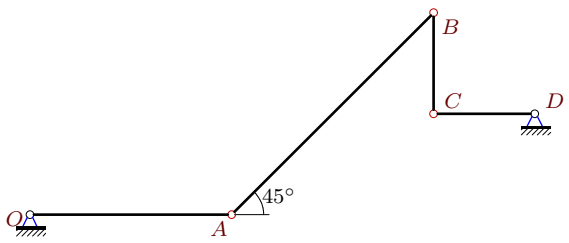
$\omega_{BCz} = -2$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{BCz} = \varepsilon_{CDz} = 2$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.2.



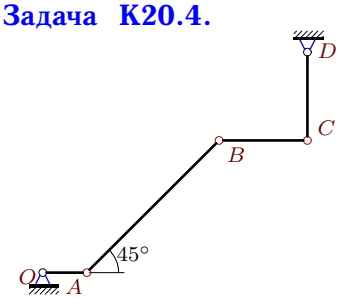
$\omega_{BCz} = -6$ рад/с, $\omega_{CDz} = 2$ рад/с,
$\varepsilon_{BCz} = \varepsilon_{CDz} = 4$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.3.



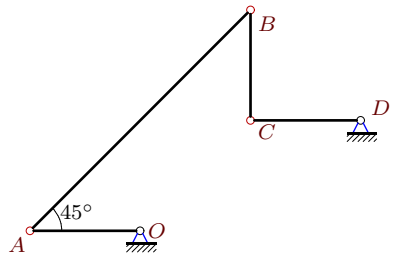
$\omega_{BCz} = -6$ рад/с, $\omega_{CDz} = 2$ рад/с,
$\varepsilon_{OAz} = 2$ рад/с^2, $\varepsilon_{BCz} = 8$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.4.



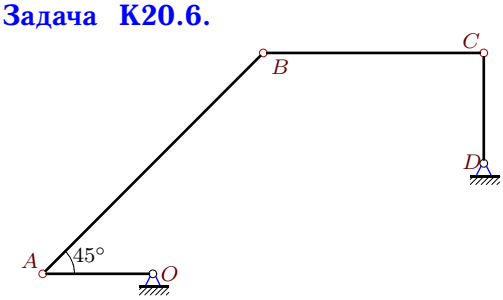
$\omega_{BCz} = -3$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = 0$, $\varepsilon_{BCz} = 39$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = CD = 2$.

Задача К20.5.



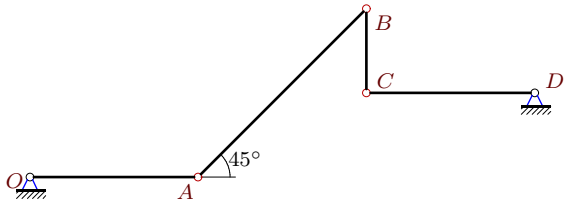
$\omega_{OAz} = \omega_{BCz} = 2$ рад/с,
$\varepsilon_{OAz} = -2$ рад/с^2, $\varepsilon_{BCz} = -8$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.6.



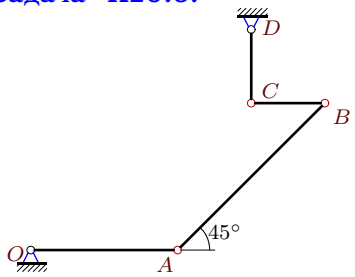
$\omega_{BCz} = 2$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = \varepsilon_{BCz} = -4$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.7.



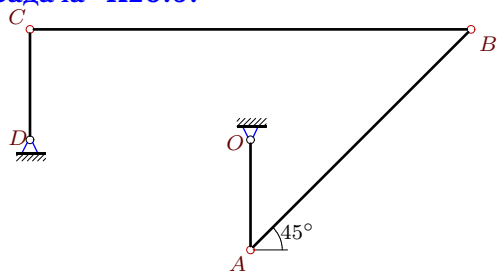
$\omega_{BCz} = -12$ рад/с, $\omega_{CDz} = 4$ рад/с,
$\varepsilon_{BCz} = 40$ рад/с^2, $\varepsilon_{CDz} = -2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.8.



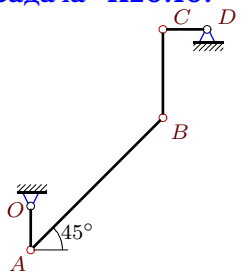
$\omega_{BCz} = -4$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -2$ рад/с^2, $\varepsilon_{BCz} = 2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.9.



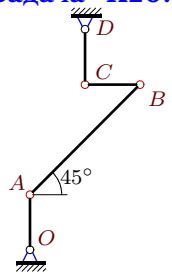
$\omega_{OAz} = -8$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -24$ рад/с^2, $\varepsilon_{BCz} = -4$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 4$, $CD = 1$.

Задача К20.10.



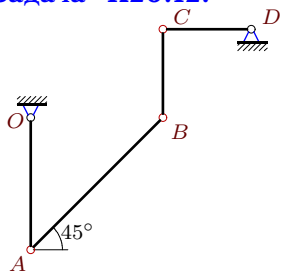
$\omega_{OAz} = \omega_{CDz} = -6$ рад/с,
$\varepsilon_{OAz} = -18$ рад/с^2, $\varepsilon_{BCz} = -57$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.11.



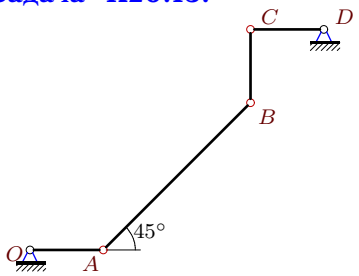
$\omega_{OAz} = -2$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{BCz} = -4$ рад/с^2, $\varepsilon_{CDz} = -2$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.12.



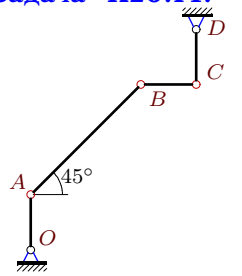
$\omega_{OAz} = -6$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -12$ рад/с^2, $\varepsilon_{BCz} = -51$ рад/с^2,
$OA = 3$, $AB = 3\sqrt{2}$, $BC = CD = 2$.

Задача К20.13.



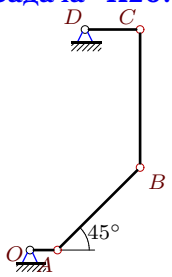
$\omega_{OAz} = \omega_{BCz} = -2$ рад/с,
$\varepsilon_{BCz} = -14$ рад/с^2, $\varepsilon_{CDz} = -2$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.14.



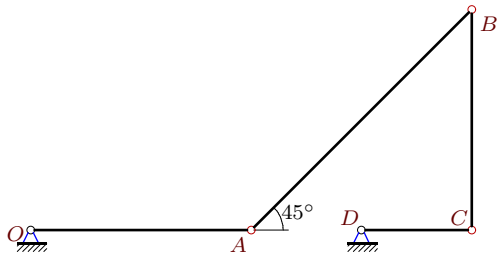
$\omega_{BCz} = 4$ рад/с, $\omega_{CDz} = 2$ рад/с,
$\varepsilon_{BCz} = 42$ рад/с^2, $\varepsilon_{CDz} = 4$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.15.



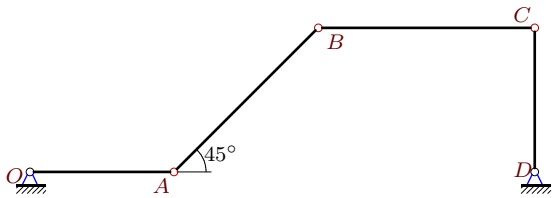
$\omega_{OAz} = -15$ рад/с, $\omega_{BCz} = -3$ рад/с,
$\varepsilon_{OAz} = \varepsilon_{CDz} = -30$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 5$, $CD = 2$.

Задача К20.16.



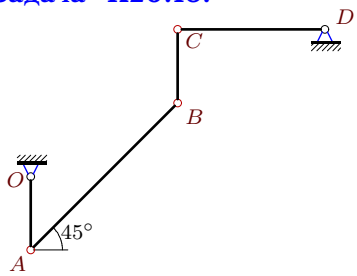
$\omega_{BCz} = -2$ рад/с, $\omega_{CDz} = 4$ рад/с,
$\varepsilon_{BCz} = 10$ рад/с^2, $\varepsilon_{CDz} = 4$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.17.



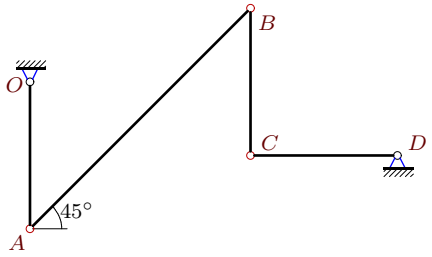
$\omega_{OAz} = 6$ рад/с, $\omega_{BCz} = 4$ рад/с,
$\varepsilon_{OAz} = 6$ рад/с^2, $\varepsilon_{CDz} = -6$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = 3$, $CD = 2$.

Задача К20.18.



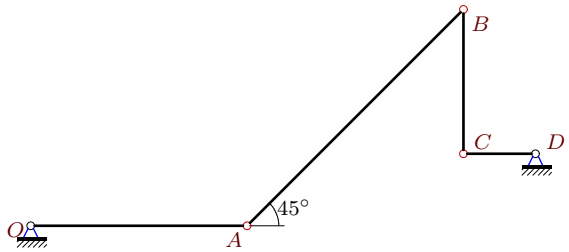
$\omega_{OAz} = -2$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = 0$, $\varepsilon_{CDz} = -4$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.19.



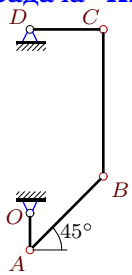
$\omega_{OAz} = 6$ рад/с, $\omega_{BCz} = -6$ рад/с,
$\varepsilon_{BCz} = -72$ рад/с^2, $\varepsilon_{CDz} = -6$ рад/с^2,
$OA = 2$, $AB = 3\sqrt{2}$, $BC = CD = 2$.

Задача К20.20.



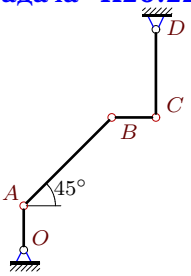
$\omega_{BCz} = -12$ рад/с, $\omega_{CDz} = 6$ рад/с,
$\varepsilon_{OAz} = 12$ рад/с^2, $\varepsilon_{BCz} = 102$ рад/с^2,
$OA = 3$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.21.



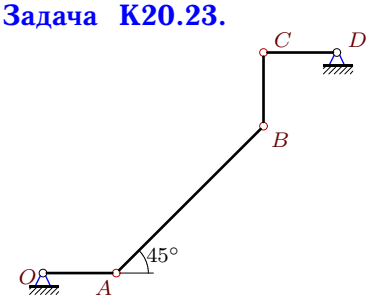
$\omega_{OAz} = -8$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{BCz} = 18$ рад/с^2, $\varepsilon_{CDz} = -16$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 4$, $CD = 2$.

Задача К20.22.



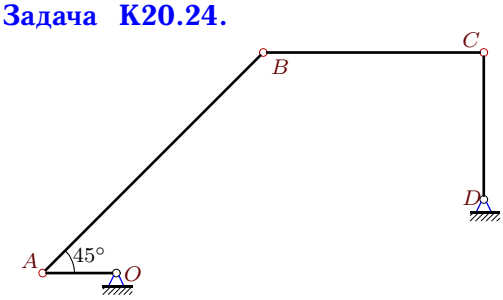
$\omega_{BCz} = -6$ рад/с, $\omega_{CDz} = -4$ рад/с,
$\varepsilon_{OAz} = \varepsilon_{CDz} = -2$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.23.



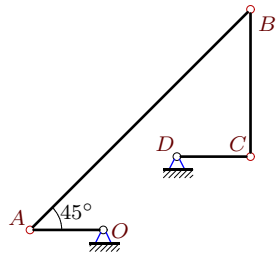
$\omega_{BCz} = -4$ рад/с, $\omega_{CDz} = -2$ рад/с,
$\varepsilon_{OAz} = 0$, $\varepsilon_{BCz} = -42$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.24.



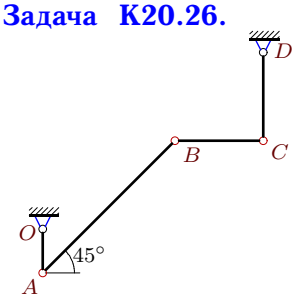
$\omega_{OAz} = 9$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -9$ рад/с^2, $\varepsilon_{BCz} = -33$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 3$, $CD = 2$.

Задача К20.25.



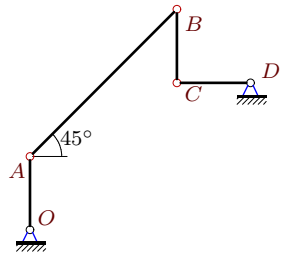
$\omega_{BCz} = 3$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = \varepsilon_{CDz} = -6$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.26.



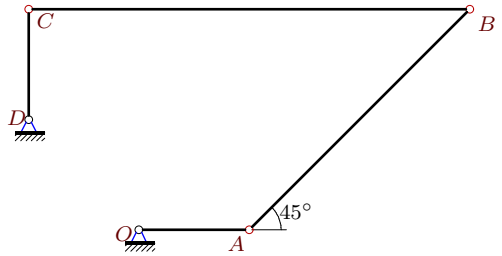
$\omega_{OAz} = 6$ рад/с, $\omega_{CDz} = -12$ рад/с,
$\varepsilon_{OAz} = 0$, $\varepsilon_{CDz} = 12$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = CD = 2$.

Задача К20.27.



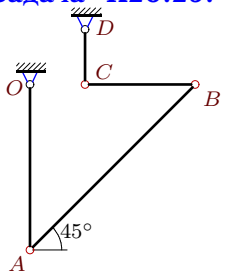
$\omega_{OAz} = 2$ рад/с, $\omega_{BCz} = 4$ рад/с,
$\varepsilon_{OAz} = -2$ рад/с^2, $\varepsilon_{BCz} = -8$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.28.



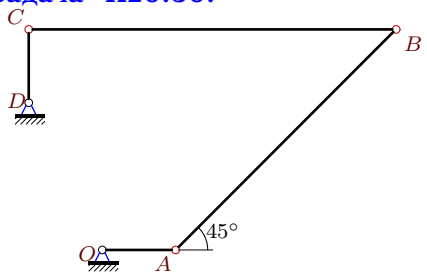
$\omega_{OAz} = -8$ рад/с, $\omega_{BCz} = -4$ рад/с,
$\varepsilon_{OAz} = -16$ рад/с^2, $\varepsilon_{BCz} = -8$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 4$, $CD = 1$.

Задача К20.29.



$\omega_{BCz} = -9$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -12$ рад/с^2, $\varepsilon_{BCz} = 12$ рад/с^2,
$OA = 3$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.30.



$\omega_{BCz} = -6$ рад/с, $\omega_{CDz} = -15$ рад/с,
$\varepsilon_{OAz} = 0$, $\varepsilon_{CDz} = -30$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 5$, $CD = 1$.

К20 **Ответы.**

Уравнение трех угловых ускорений. Две степени свободы

13.04.2012

№	ω_{OAz}	ω_{ABz}	ω_{BCz}	ω_{CDz}	ε_{OA}	ε_{AB}	ε_{BC}	ε_{CD}
1	2	1	—	—	6	−2	—	—
2	2	−3	—	—	2	−13	—	—
3	2	−3	—	—	—	−11	—	0
4	6	0	—	—	—	−26	—	12
5	—	1	—	0	—	−3	—	2
6	4	0	—	—	—	2	—	−4
7	2	−6	—	—	2	−36	—	—
8	−2	0	—	—	—	3	—	2
9	—	−4	−2	—	—	−24	—	−8
10	—	2	−6	—	—	16	—	0
11	—	1	2	—	2	1	—	—
12	—	0	−9	—	—	22	—	−6
13	—	1	—	0	0	4	—	—
14	2	−2	—	—	−2	−13	—	—
15	—	5	—	0	—	30	−78	—
16	4	−2	—	—	4	−2	—	—
17	—	−12	—	−12	—	−210	136	—
18	—	0	−2	—	—	4	−8	—
19	—	0	—	0	6	−44	—	—
20	6	−8	—	—	—	−44	—	0
21	—	0	−2	—	−8	−40	—	—
22	2	3	—	—	—	−24	102	—
23	−2	2	—	—	—	13	—	−2
24	—	0	3	—	—	30	—	18
25	6	2	—	—	—	−6	−21	—
26	—	10	−15	—	—	−258	663	—
27	—	1	—	−2	—	−6	—	2
28	—	−4	—	−8	—	−24	—	−16
29	−6	−6	—	—	—	8	—	−6
30	−15	−5	—	—	—	−50	0	—

К20 файл o20k1A