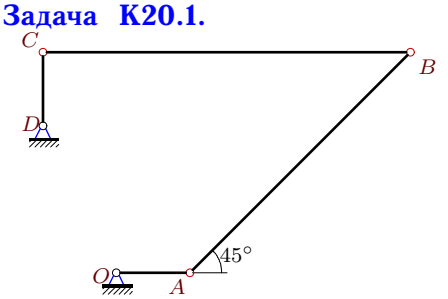
Уравнение трех угловых ускорений. Две степени свободы

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.

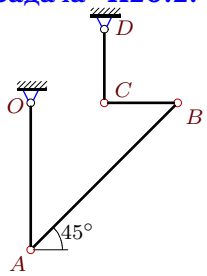
Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.183.)

Задача К20.1. *10*



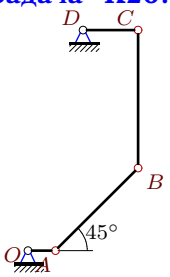
$\omega_{OAz} = -15$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -15$ рад/с^2, $\varepsilon_{BCz} = -42$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 5$, $CD = 1$.

Задача К20.2. *10*



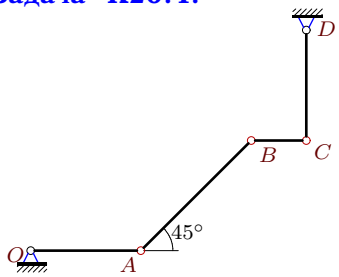
$\omega_{OAz} = -2$ рад/с, $\omega_{CDz} = 2$ рад/с,
$\varepsilon_{OAz} = -2$ рад/с^2, $\varepsilon_{BCz} = 2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.3. *10*



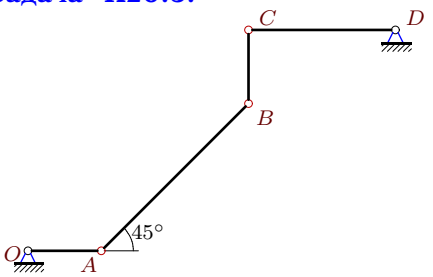
$\omega_{OAz} = -15$ рад/с, $\omega_{BCz} = 9$ рад/с,
$\varepsilon_{BCz} = -45$ рад/с^2, $\varepsilon_{CDz} = 15$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 5$, $CD = 2$.

Задача К20.4. *10*



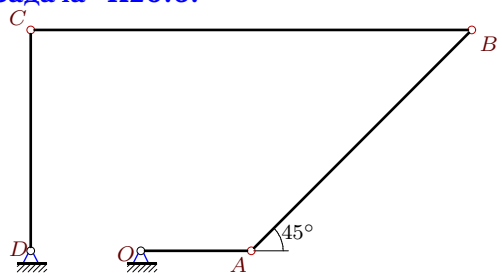
$\omega_{OAz} = 2$ рад/с, $\omega_{BCz} = 4$ рад/с,
$\varepsilon_{OAz} = 2$ рад/с^2, $\varepsilon_{BCz} = 116$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.5. *10*



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

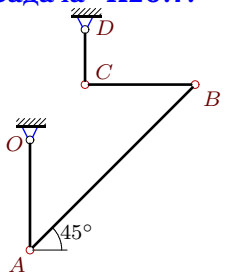
Задача К20.6. *10*



$\omega_{OAz} = -8$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{BCz} = -20$ рад/с^2, $\varepsilon_{CDz} = -16$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 4$, $CD = 2$.

Задача К20.7.

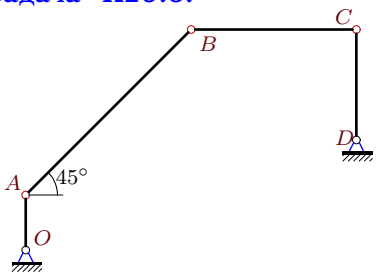
10



$\omega_{OAz} = -6$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{BCz} = 21$ рад/с^2, $\varepsilon_{CDz} = -6$ рад/с^2,
$OA = 2$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.8.

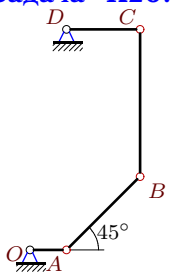
10



$\omega_{BCz} = 15$ рад/с, $\omega_{CDz} = -18$ рад/с,
$\varepsilon_{OAz} = -9$ рад/с^2, $\varepsilon_{BCz} = 489$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 3$, $CD = 2$.

Задача К20.9.

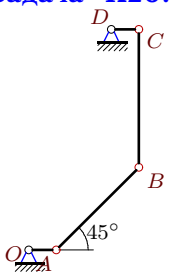
10



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

Задача К20.10.

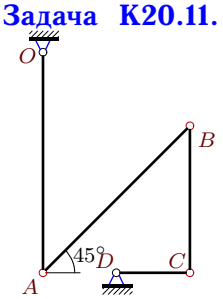
10



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

Задача К20.11.

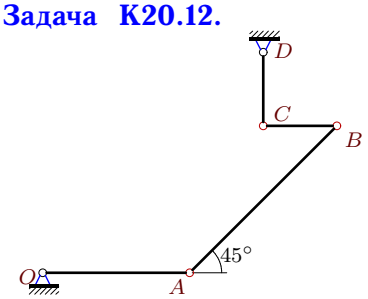
10



$\omega_{BCz} = -4$ рад/с, $\omega_{CDz} = 4$ рад/с,
$\varepsilon_{OAz} = 8$ рад/с^2, $\varepsilon_{BCz} = -50$ рад/с^2,
$OA = 3$, $AB = 2\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.12.

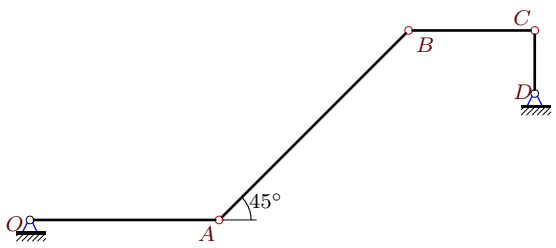
10



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

Задача К20.13.

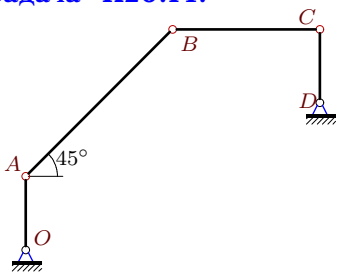
10



$\omega_{OAz} = 6$ рад/с, $\omega_{BCz} = -9$ рад/с,
$\varepsilon_{OAz} = 12$ рад/с^2, $\varepsilon_{BCz} = 111$ рад/с^2,
$OA = 3$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.14.

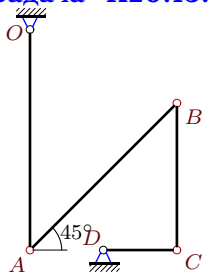
10



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

Задача К20.15.

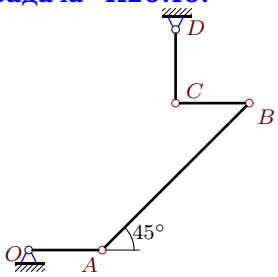
10



$\omega_{OAz} = 4$ рад/с, $\omega_{BCz} = -4$ рад/с,
$\varepsilon_{OAz} = 8$ рад/с^2, $\varepsilon_{BCz} = -50$ рад/с^2,
$OA = 3$, $AB = 2\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.16.

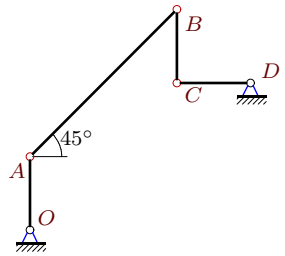
10



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

Задача К20.17.

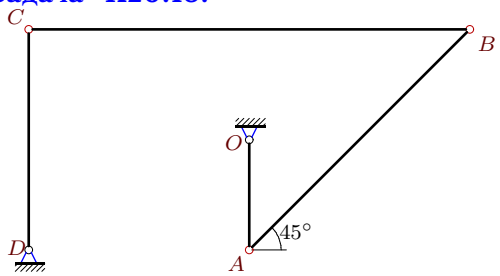
10



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

Задача К20.18.

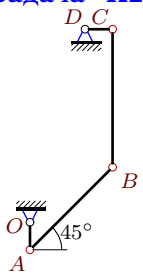
10



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

Задача К20.19.

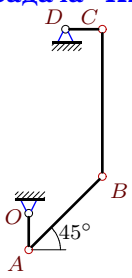
10



$\omega_{BCz} = 0$, $\omega_{CDz} = -15$ рад/с,
$\varepsilon_{OAz} = 15$ рад/с^2, $\varepsilon_{BCz} = 63$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 5$, $CD = 1$.

Задача К20.20.

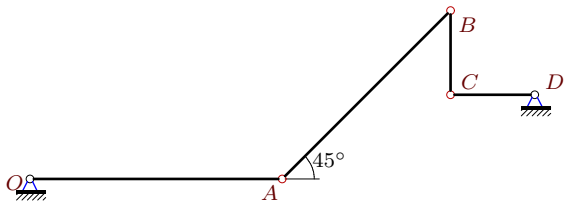
10



$\omega_{OAz} = -8$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{BCz} = 14$ рад/с^2, $\varepsilon_{CDz} = -8$ рад/с^2,
$OA = 1$, $AB = 2\sqrt{2}$, $BC = 4$, $CD = 1$.

Задача К20.21.

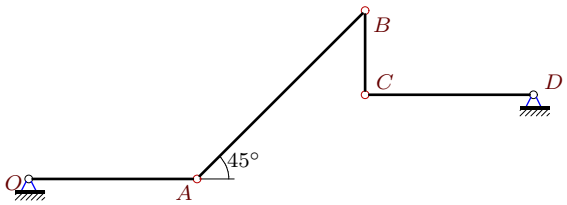
10



$\omega_{BCz} = -4$ рад/с, $\omega_{CDz} = -2$ рад/с,
$\varepsilon_{OAz} = 4$ рад/с^2, $\varepsilon_{CDz} = 2$ рад/с^2,
$OA = 3$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

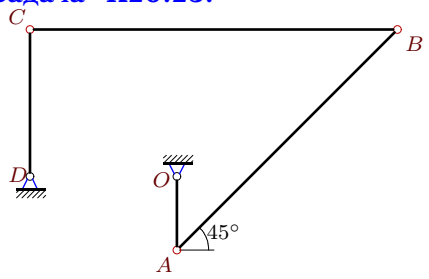
Задача К20.22.

10



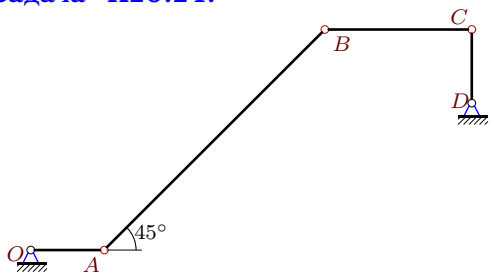
$\omega_{OAz} = 2$ рад/с, $\omega_{BCz} = -4$ рад/с,
$\varepsilon_{OAz} = \varepsilon_{CDz} = 2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.23. *10*



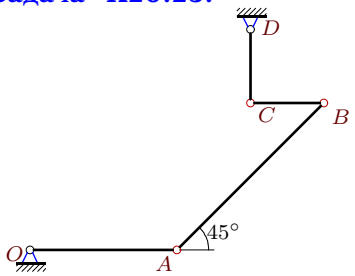
$\omega_{OAz} = -15$ рад/с, $\omega_{CDz} = -30$ рад/с,
$\varepsilon_{BCz} = -126$ рад/с^2, $\varepsilon_{CDz} = 0$,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 5$, $CD = 2$.

Задача К20.24. *10*



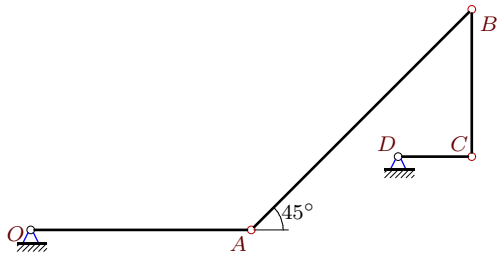
$\omega_{OAz} = 6$ рад/с, $\omega_{BCz} = -3$ рад/с,
$\varepsilon_{OAz} = 18$ рад/с^2, $\varepsilon_{CDz} = 6$ рад/с^2,
$OA = 1$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.25. *10*



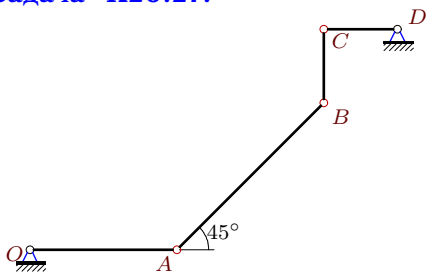
$\omega_{OAz} = \omega_{CDz} = -2$ рад/с,
$\varepsilon_{OAz} = \varepsilon_{CDz} = -2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.26. *10*



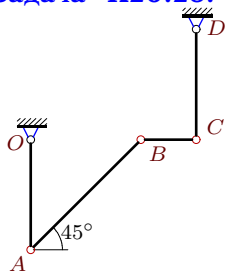
$\omega_{BCz} = -9$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = 12$ рад/с^2, $\varepsilon_{BCz} = 69$ рад/с^2,
$OA = 3$, $AB = 3\sqrt{2}$, $BC = 2$, $CD = 1$.

Задача К20.27. *10*



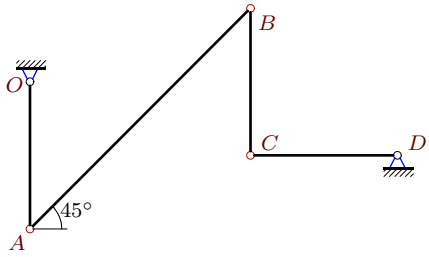
$\omega_{OAz} = -2$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = -2$ рад/с^2, $\varepsilon_{CDz} = 2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = CD = 1$.

Задача К20.28. *10*



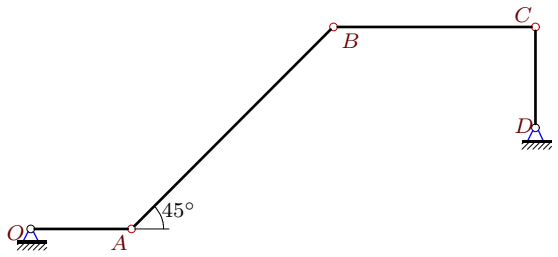
$\omega_{BCz} = -4$ рад/с, $\omega_{CDz} = 0$,
$\varepsilon_{OAz} = \varepsilon_{CDz} = 2$ рад/с^2,
$OA = 2$, $AB = 2\sqrt{2}$, $BC = 1$, $CD = 2$.

Задача К20.29. *10*



$\omega_{OAz} = \omega_{BCz} = 6$ рад/с,
$\varepsilon_{OAz} = 6$ рад/с^2, $\varepsilon_{BCz} = 258$ рад/с^2,
$OA = 2$, $AB = 3\sqrt{2}$, $BC = CD = 2$.

Задача К20.30. *10*



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

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	—	0	−3	—	—	−65	—	−15
2	—	−3	−6	—	—	8	—	−2
3	—	−15	—	−30	−15	375	—	—
4	—	−4	—	4	—	−28	—	0
5	—	1	—	0	—	8	−22	—
6	—	0	−2	—	0	−40	—	—
7	—	−4	−6	—	−6	6	—	—
8	9	−15	—	—	—	−453	—	−9
9	—	4	—	0	—	12	−30	—
10	—	10	−6	—	—	165	−159	—
11	4	2	—	—	—	−34	—	4
12	−2	1	—	—	—	−1	—	−4
13	—	0	—	0	—	−86	—	12
14	4	−2	—	—	−4	−4	—	—
15	—	2	—	4	—	−34	—	4
16	—	0	—	0	0	−1	—	—
17	—	0	2	—	—	−1	−4	—
18	−8	−4	—	—	—	0	—	8
19	−15	−5	—	—	—	−50	—	0
20	—	0	−2	—	0	−28	—	—
21	2	−2	—	—	—	−11	2	—
22	—	−2	—	0	—	−8	0	—
23	—	−25	−15	—	−30	−260	—	—
24	—	0	—	0	—	−16	15	—
25	—	1	−2	—	—	−2	−14	—
26	6	−6	—	—	—	−26	—	12
27	—	2	−4	—	—	13	−42	—
28	2	2	—	—	—	−12	24	—
29	—	8	—	−12	—	16	—	0
30	4	0	—	—	12	−10	—	—

К20 файл o20k10A