

## Скорости точек многозвенного механизма

Плоский многозвенный механизм с одной степенью свободы приводится в движение кривошипом, который вращается против часовой стрелки с постоянной угловой скоростью. Найти скорости точек механизма (в см/с) и угловые скорости его звеньев (в рад/с). Размеры даны в см.

*Кирсанов М.Н. Решебник. Теоретическая механика с. 158.*

**Вариант 1**

$\omega_{OA} = 1 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $DB = 50, DF = 30,$   
 $NC = 40, EH = 30,$   
 $FE = 15, FG = 30,$   
 $OA = 20, KG = 20.$

**Вариант 2**

$\omega_{OA} = 2 \text{ рад/с,}$   
 $\alpha = 45^\circ,$   
 $AB = 30, BC = 30,$   
 $NB = 60, NF = 30,$   
 $CD = 15, EH = 30,$   
 $FE = 35, FG = 10,$   
 $OA = 30, KG = 25.$

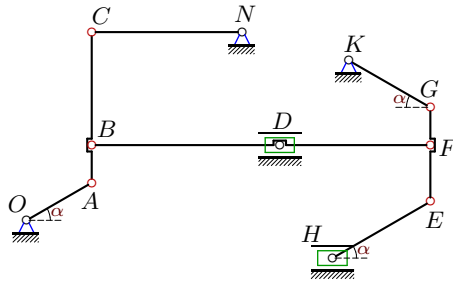
**Вариант 3**

$\omega_{OA} = 3 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 30, BC = 30,$   
 $DB = 20, DF = 15,$   
 $NC = 15, EH = 30,$   
 $FE = 15, FG = 20,$   
 $OA = 30, KG = 25.$

**Вариант 4**

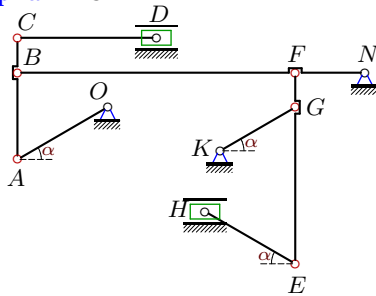
$\omega_{KG} = 4 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 20, BC = 10,$   
 $BF = 20, NF = 80,$   
 $CD = 15, EH = 30,$   
 $FG = 10, GE = 24,$   
 $OA = 20, KG = 25.$

**Вариант 5**



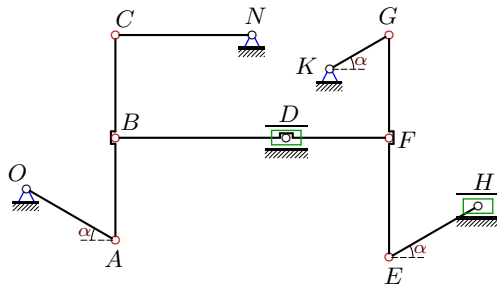
$\omega_{OA} = 5 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $DB = 50, DF = 40,$   
 $NC = 40, EH = 30,$   
 $FE = 15, FG = 10,$   
 $OA = 20, KG = 25.$

**Вариант 6**



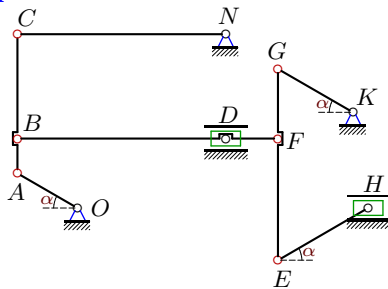
$\omega_{KG} = 6 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 25, BC = 10,$   
 $BF = 80, NF = 20,$   
 $CD = 40, EH = 30,$   
 $FG = 10, GE = 45,$   
 $OA = 30, KG = 25.$

**Вариант 7**



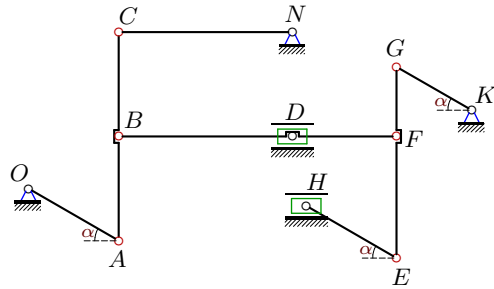
$\omega_{NC} = 7 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 30, BC = 30,$   
 $DB = 50, DF = 30,$   
 $NC = 40, EH = 30,$   
 $FE = 35, FG = 30,$   
 $OA = 30, KG = 20.$

**Вариант 8**



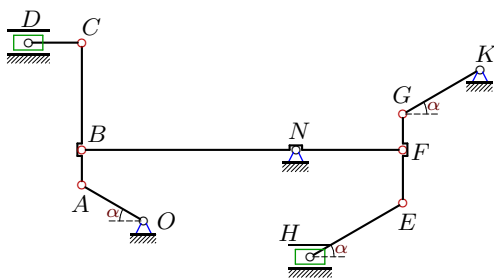
$\omega_{NC} = 8 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $DB = 60, DF = 15,$   
 $NC = 60, EH = 30,$   
 $FE = 35, FG = 20,$   
 $OA = 20, KG = 25.$

**Вариант 9**



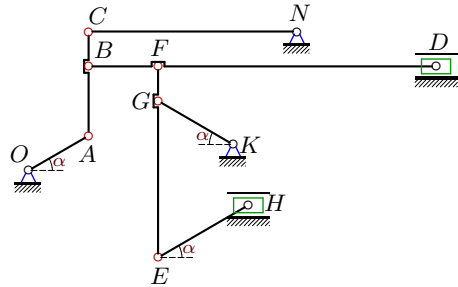
$\omega_{OA} = 9 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 30, BC = 30,$   
 $DB = 50, DF = 30,$   
 $NC = 50, EH = 30,$   
 $FE = 35, FG = 20,$   
 $OA = 30, KG = 25.$

**Вариант 10**



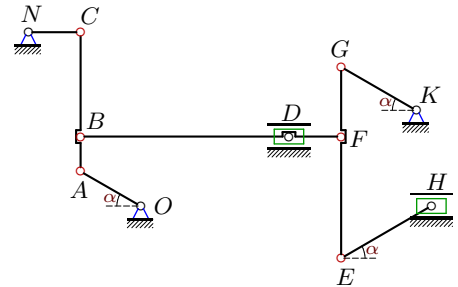
$\omega_{BF} = 10 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $NB = 60, NF = 30,$   
 $CD = 15, EH = 30,$   
 $FE = 15, FG = 10,$   
 $OA = 20, KG = 25.$

**Вариант 11**



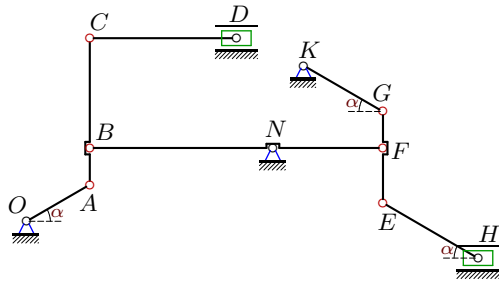
$\omega_{OA} = 11 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 20, BC = 10,$   
 $BF = 20, FD = 80,$   
 $NC = 60, EH = 30,$   
 $FE = 55, FG = 10,$   
 $OA = 20, KG = 25.$

**Вариант 12**



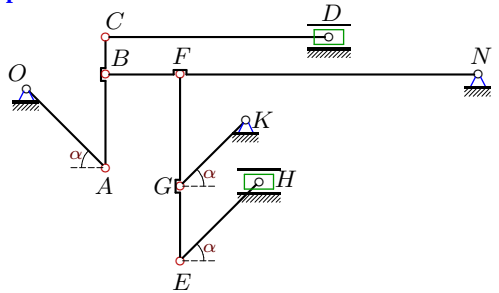
$\omega_{OA} = 12 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $DB = 60, DF = 15,$   
 $NC = 15, EH = 30,$   
 $FE = 35, FG = 20,$   
 $OA = 20, KG = 25.$

**Вариант 13**



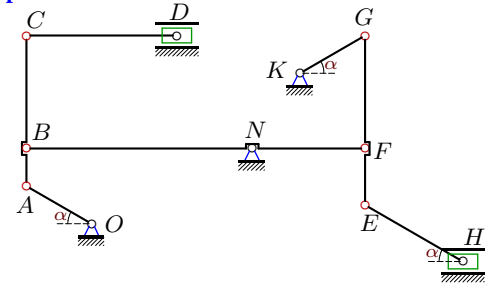
$\omega_{BF} = 13 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $NB = 50, NF = 30,$   
 $CD = 40, EH = 30,$   
 $FE = 15, FG = 10,$   
 $OA = 20, KG = 25.$

**Вариант 14**



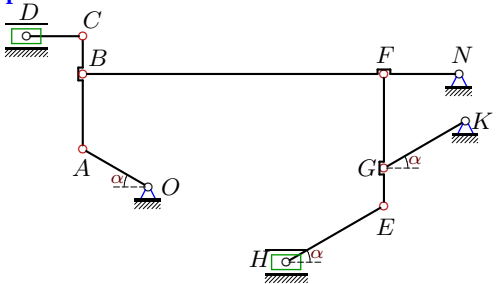
$\omega_{OA} = 14 \text{ рад/с,}$   
 $\alpha = 45^\circ,$   
 $AB = 25, BC = 10,$   
 $BF = 20, NF = 80,$   
 $CD = 60, EH = 30,$   
 $FG = 30, GE = 20,$   
 $OA = 30, KG = 25.$

**Вариант 15**



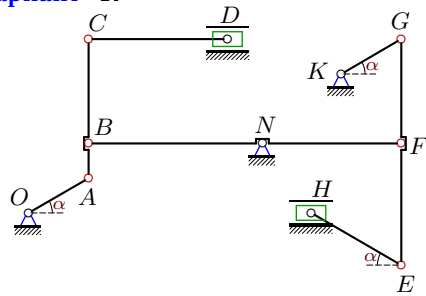
$\omega_{BF} = 15 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $NB = 60, NF = 30,$   
 $CD = 40, EH = 30,$   
 $FE = 15, FG = 30,$   
 $OA = 20, KG = 20.$

**Вариант 16**



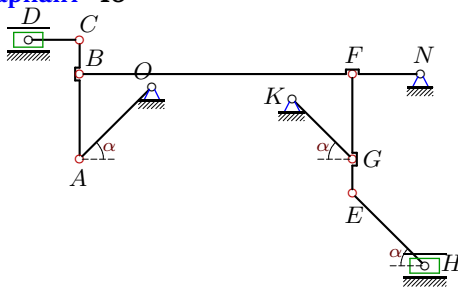
$\omega_{KG} = 16 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 20, BC = 10,$   
 $BF = 80, NF = 20,$   
 $CD = 15, EH = 30,$   
 $FG = 25, GE = 10,$   
 $OA = 20, KG = 25.$

**Вариант 17**



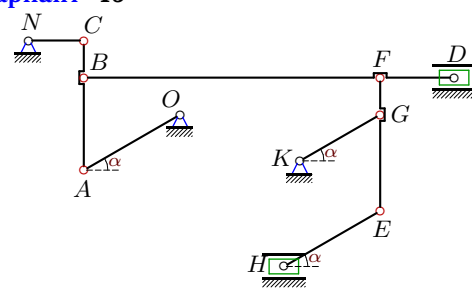
$\omega_{KG} = 17 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 10, BC = 30,$   
 $NB = 50, NF = 40,$   
 $CD = 40, EH = 30,$   
 $FE = 35, FG = 30,$   
 $OA = 20, KG = 20.$

**Вариант 18**



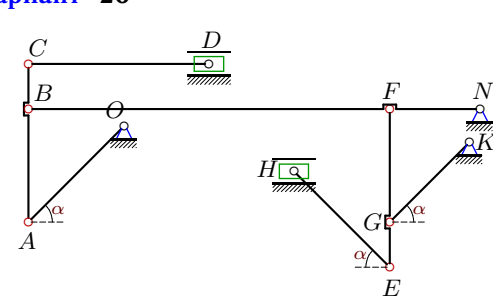
$\omega_{KG} = 18 \text{ рад/с,}$   
 $\alpha = 45^\circ,$   
 $AB = 25, BC = 10,$   
 $BF = 80, NF = 20,$   
 $CD = 15, EH = 30,$   
 $FG = 25, GE = 10,$   
 $OA = 30, KG = 25.$

**Вариант 19**



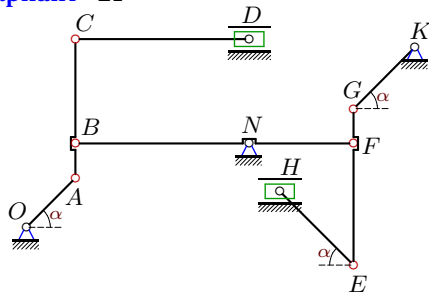
$\omega_{OA} = 19 \text{ рад/с,}$   
 $\alpha = 30^\circ,$   
 $AB = 25, BC = 10,$   
 $BF = 80, FD = 20,$   
 $NC = 15, EH = 30,$   
 $FE = 36, FG = 10,$   
 $OA = 30, KG = 25.$

**Вариант 20**



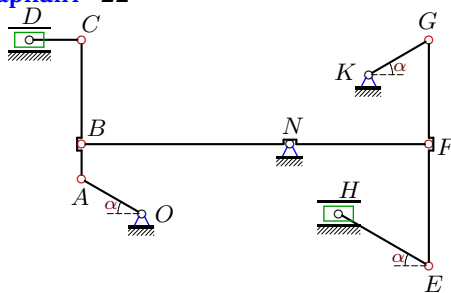
$\omega_{KG} = 20 \text{ рад/с,}$   
 $\alpha = 45^\circ,$   
 $AB = 25, BC = 10,$   
 $BF = 80, NF = 20,$   
 $CD = 40, EH = 30,$   
 $FG = 25, GE = 10,$   
 $OA = 30, KG = 25.$

**Вариант 21**



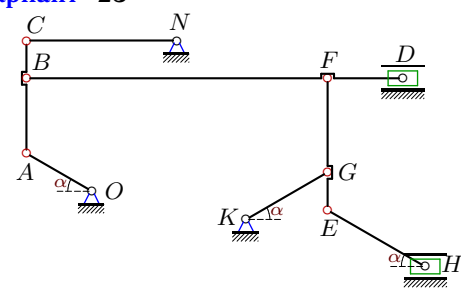
$\omega_{BF} = 21$  рад/с,  
 $\alpha = 45^\circ$ ,  
 $AB = 10, BC = 30$ ,  
 $NB = 50, NF = 30$ ,  
 $CD = 50, EH = 30$ ,  
 $FE = 35, FG = 10$ ,  
 $OA = 20, KG = 25$ .

**Вариант 22**



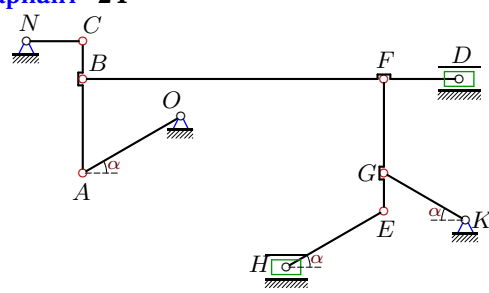
$\omega_{OA} = 22$  рад/с,  
 $\alpha = 30^\circ$ ,  
 $AB = 10, BC = 30$ ,  
 $NB = 60, NF = 40$ ,  
 $CD = 15, EH = 30$ ,  
 $FE = 35, FG = 30$ ,  
 $OA = 20, KG = 20$ .

**Вариант 23**



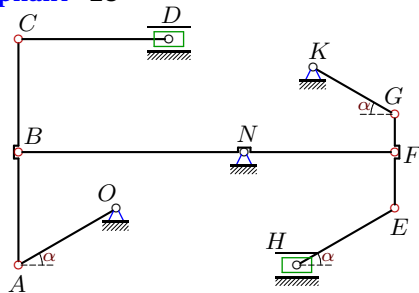
$\omega_{NC} = 23$  рад/с,  
 $\alpha = 30^\circ$ ,  
 $AB = 20, BC = 10$ ,  
 $BF = 80, FD = 20$ ,  
 $NC = 40, EH = 30$ ,  
 $FE = 35, FG = 25$ ,  
 $OA = 20, KG = 25$ .

**Вариант 24**



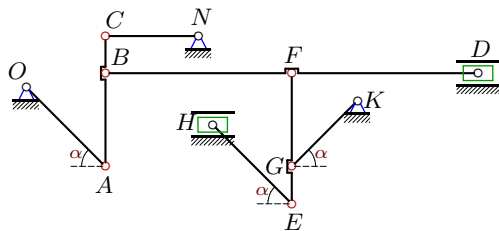
$\omega_{OA} = 24$  рад/с,  
 $\alpha = 30^\circ$ ,  
 $AB = 25, BC = 10$ ,  
 $BF = 80, FD = 20$ ,  
 $NC = 15, EH = 30$ ,  
 $FE = 35, FG = 25$ ,  
 $OA = 30, KG = 25$ .

**Вариант 25**



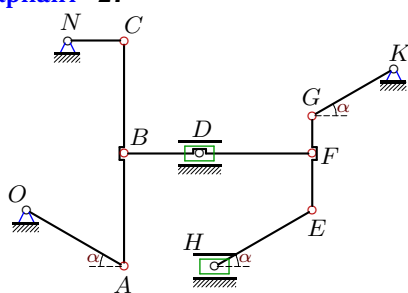
$\omega_{BF} = 25$  рад/с,  
 $\alpha = 30^\circ$ ,  
 $AB = 30, BC = 30,$   
 $NB = 60, NF = 40,$   
 $CD = 40, EH = 30,$   
 $FE = 15, FG = 10,$   
 $OA = 30, KG = 25.$

**Вариант 26**



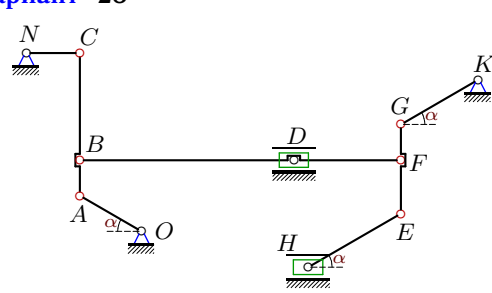
$\omega_{OA} = 26$  рад/с,  
 $\alpha = 45^\circ$ ,  
 $AB = 25, BC = 10,$   
 $BF = 50, FD = 50,$   
 $NC = 25, EH = 30,$   
 $FE = 35, FG = 25,$   
 $OA = 30, KG = 25.$

**Вариант 27**



$\omega_{NC} = 27$  рад/с,  
 $\alpha = 30^\circ$ ,  
 $AB = 30, BC = 30,$   
 $DB = 20, DF = 30,$   
 $NC = 15, EH = 30,$   
 $FE = 15, FG = 10,$   
 $OA = 30, KG = 25.$

**Вариант 28**



$\omega_{OA} = 28$  рад/с,  
 $\alpha = 30^\circ$ ,  
 $AB = 10, BC = 30,$   
 $DB = 60, DF = 30,$   
 $NC = 15, EH = 30,$   
 $FE = 15, FG = 10,$   
 $OA = 20, KG = 25.$





Ответы

	$v_A$	$v_B$	$v_C$	$v_D$	$v_E$	$v_F$	$v_G$	$v_H$
1	20.000	18.875	17.321	7.500	17.637	12.816	12.000	8.250
2	60.000	42.426	60.000	42.426	77.217	21.213	30.000	53.033
3	90.000	81.125	77.942	22.500	87.188	62.637	67.500	98.438
4	125.000	108.253	112.673	31.250	190.788	86.603	100.000	120.000
5	100.000	94.373	86.603	37.500	77.065	78.780	80.000	73.750
6	750.000	649.519	666.615	150.000	432.471	129.904	150.000	487.500
7	323.316	291.433	280.000	80.829	179.065	186.433	193.990	35.026
8	554.256	523.068	480.000	207.846	703.136	240.000	138.564	623.538
9	270.000	243.375	233.827	67.500	356.170	155.690	162.000	408.375
10	692.820	600.000	1200.000	1039.230	396.863	300.000	346.410	433.013
11	220.000	194.022	190.526	36.667	666.658	156.769	176.000	737.000
12	240.000	226.495	207.846	90.000	304.467	103.923	60.000	270.000
13	750.555	650.000	1300.000	1125.833	515.922	390.000	450.333	562.917
14	420.000	296.985	319.862	118.794	461.788	237.588	336.000	158.392
15	1039.230	900.000	1800.000	1558.846	468.375	450.000	519.615	129.904
16	2000.000	1732.051	1802.776	500.000	445.421	346.410	400.000	80.000
17	425.000	368.061	736.122	637.500	355.016	294.449	340.000	28.333
18	2250.000	1590.990	1713.549	636.396	547.449	318.198	450.000	127.279
19	570.000	500.306	493.634	81.429	98.942	127.975	114.000	63.514
20	2500.000	1767.767	1903.943	707.107	608.276	353.553	500.000	848.528
21	1484.924	1050.000	3320.392	3150.000	2293.235	630.000	890.955	1575.000
22	440.000	381.051	762.102	660.000	306.288	254.034	293.333	24.444
23	1062.324	936.882	920.000	177.054	286.456	255.351	212.465	325.780
24	720.000	631.965	623.538	102.857	188.944	161.653	144.000	213.943
25	1732.051	1500.000	1732.051	866.025	1322.876	1000.000	1154.701	288.675
26	780.000	573.614	551.543	157.584	527.023	317.620	390.000	724.885
27	467.654	421.537	405.000	116.913	650.946	618.648	701.481	584.567
28	560.000	528.488	484.974	210.000	397.524	320.780	280.000	175.000
29	906.250	784.836	1569.671	1359.375	1415.608	627.868	725.000	1631.250
30	519.615	458.258	450.000	86.603	324.500	241.091	259.808	103.923