

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

$\omega_{OA} = 1 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 30, BC = 30,$
 $DB = 50, DF = 30,$
 $NC = 40, EH = 30,$
 $FE = 35, FG = 10,$
 $OA = 30, KG = 25.$

Вариант 2

$\omega_{OA} = 2 \text{ рад/с,}$
 $\alpha = 45^\circ,$
 $AB = 20, BC = 10,$
 $BF = 50, FD = 50,$
 $NC = 25, EH = 30,$
 $FE = 35, FG = 25,$
 $OA = 20, KG = 25.$

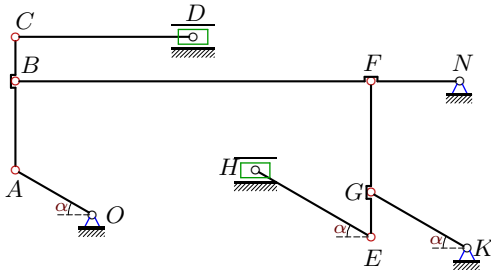
Вариант 3

$\omega_{KG} = 3 \text{ рад/с,}$
 $\alpha = 45^\circ,$
 $AB = 25, BC = 10,$
 $BF = 80, NF = 20,$
 $CD = 15, EH = 30,$
 $FG = 30, GE = 20,$
 $OA = 30, KG = 25.$

Вариант 4

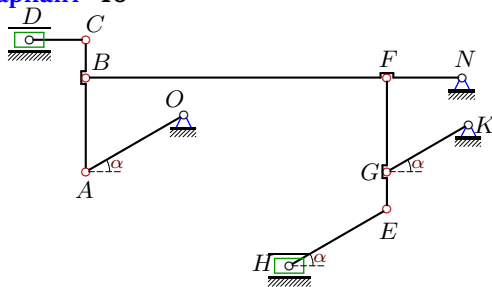
$\omega_{OA} = 4 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 30, BC = 30,$
 $NB = 20, NF = 40,$
 $CD = 15, EH = 30,$
 $FE = 15, FG = 30,$
 $OA = 30, KG = 20.$

Вариант 9



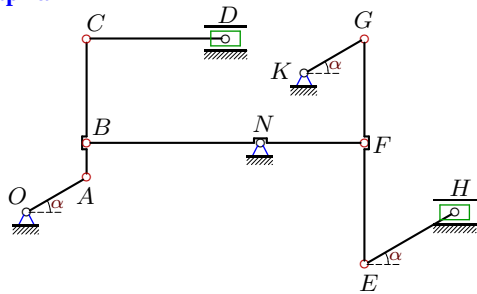
$\omega_{OA} = 9 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 20, BC = 10,$
 $BF = 80, NF = 20,$
 $CD = 40, EH = 30,$
 $FG = 25, GE = 10,$
 $OA = 20, KG = 25.$

Вариант 10



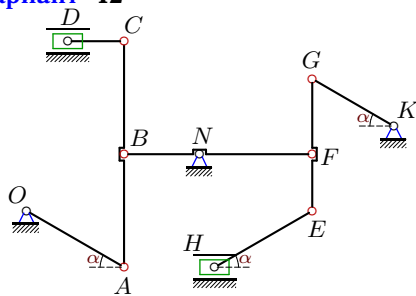
$\omega_{KG} = 10 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 25, BC = 10,$
 $BF = 80, NF = 20,$
 $CD = 15, EH = 30,$
 $FG = 25, GE = 10,$
 $OA = 30, KG = 25.$

Вариант 11



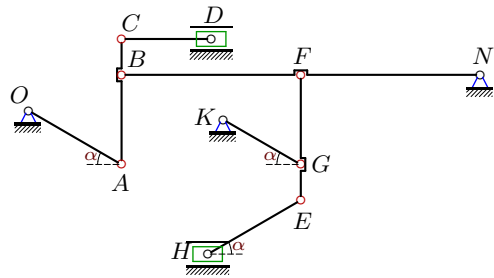
$\omega_{OA} = 11 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 10, BC = 30,$
 $NB = 50, NF = 30,$
 $CD = 40, EH = 30,$
 $FE = 35, FG = 30,$
 $OA = 20, KG = 20.$

Вариант 12



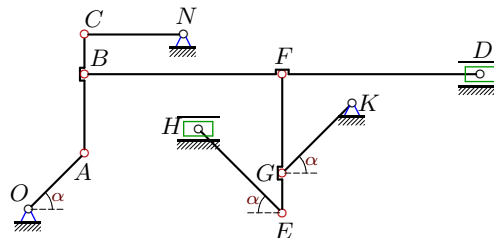
$\omega_{KG} = 12 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 30, BC = 30,$
 $NB = 20, NF = 30,$
 $CD = 15, EH = 30,$
 $FE = 15, FG = 20,$
 $OA = 30, KG = 25.$

Вариант 13



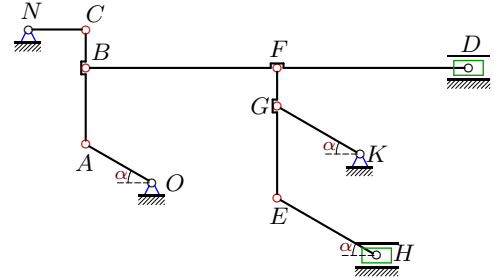
$\omega_{KG} = 13$ рад/с,
 $\alpha = 30^\circ$,
 $AB = 25, BC = 10,$
 $BF = 50, NF = 50,$
 $CD = 25, EH = 30,$
 $FG = 25, GE = 10,$
 $OA = 30, KG = 25.$

Вариант 14



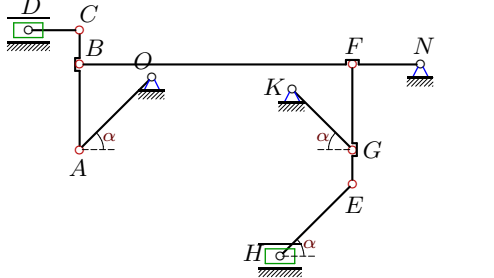
$\omega_{NC} = 14$ рад/с,
 $\alpha = 45^\circ$,
 $AB = 20, BC = 10,$
 $BF = 50, FD = 50,$
 $NC = 25, EH = 30,$
 $FE = 35, FG = 25,$
 $OA = 20, KG = 25.$

Вариант 15



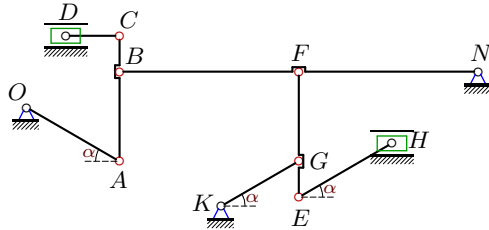
$\omega_{OA} = 15$ рад/с,
 $\alpha = 30^\circ$,
 $AB = 20, BC = 10,$
 $BF = 50, FD = 50,$
 $NC = 15, EH = 30,$
 $FE = 34, FG = 10,$
 $OA = 20, KG = 25.$

Вариант 16



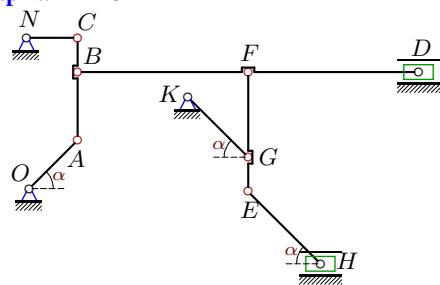
$\omega_{NB} = 16$ рад/с,
 $\alpha = 45^\circ$,
 $AB = 25, BC = 10,$
 $BF = 80, NF = 20,$
 $CD = 15, EH = 30,$
 $FG = 25, GE = 10,$
 $OA = 30, KG = 25.$

Вариант 17



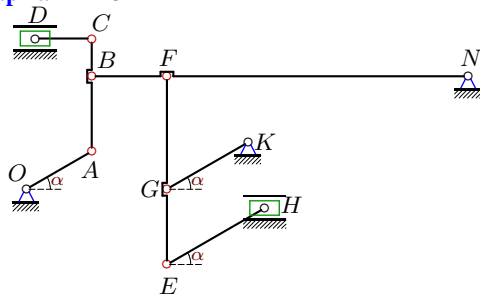
$\omega_{OA} = 17 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 25, BC = 10,$
 $BF = 50, NF = 50,$
 $CD = 15, EH = 30,$
 $FG = 25, GE = 10,$
 $OA = 30, KG = 25.$

Вариант 18



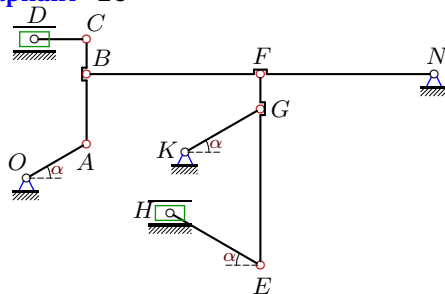
$\omega_{OA} = 18 \text{ рад/с,}$
 $\alpha = 45^\circ,$
 $AB = 20, BC = 10,$
 $BF = 50, FD = 50,$
 $NC = 15, EH = 30,$
 $FE = 35, FG = 25,$
 $OA = 20, KG = 25.$

Вариант 19



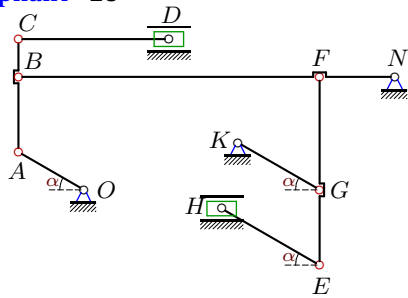
$\omega_{OA} = 19 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 20, BC = 10,$
 $BF = 20, NF = 80,$
 $CD = 15, EH = 30,$
 $FG = 30, GE = 20,$
 $OA = 20, KG = 25.$

Вариант 20



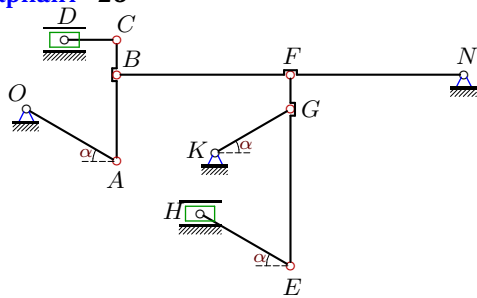
$\omega_{OA} = 20 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 20, BC = 10,$
 $BF = 50, NF = 50,$
 $CD = 15, EH = 30,$
 $FG = 10, GE = 45,$
 $OA = 20, KG = 25.$

Вариант 25



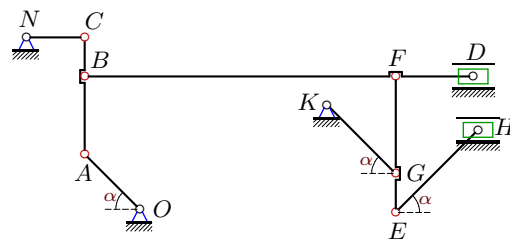
$\omega_{NB} = 25$ рад/с,
 $\alpha = 30^\circ$,
 $AB = 20, BC = 10,$
 $BF = 80, NF = 20,$
 $CD = 40, EH = 30,$
 $FG = 30, GE = 20,$
 $OA = 20, KG = 25.$

Вариант 26



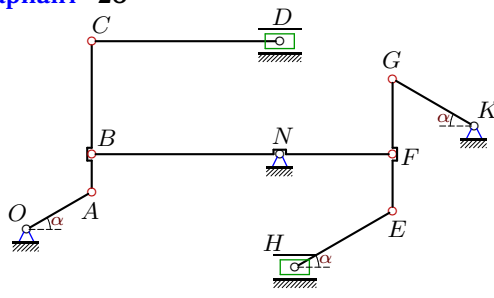
$\omega_{KG} = 26$ рад/с,
 $\alpha = 30^\circ$,
 $AB = 25, BC = 10,$
 $BF = 50, NF = 50,$
 $CD = 15, EH = 30,$
 $FG = 10, GE = 45,$
 $OA = 30, KG = 25.$

Вариант 27



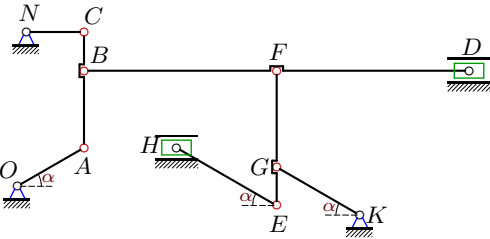
$\omega_{NC} = 27$ рад/с,
 $\alpha = 45^\circ$,
 $AB = 20, BC = 10,$
 $BF = 80, FD = 20,$
 $NC = 15, EH = 30,$
 $FE = 35, FG = 25,$
 $OA = 20, KG = 25.$

Вариант 28



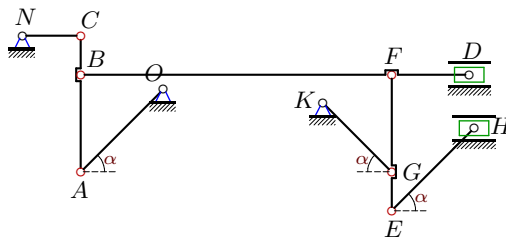
$\omega_{KG} = 28$ рад/с,
 $\alpha = 30^\circ$,
 $AB = 10, BC = 30,$
 $NB = 50, NF = 30,$
 $CD = 50, EH = 30,$
 $FE = 15, FG = 20,$
 $OA = 20, KG = 25.$

Вариант 29



$\omega_{NC} = 29 \text{ рад/с,}$
 $\alpha = 30^\circ,$
 $AB = 20, BC = 10,$
 $BF = 50, FD = 50,$
 $NC = 15, EH = 30,$
 $FE = 35, FG = 25,$
 $OA = 20, KG = 25.$

Вариант 30



$\omega_{NC} = 30 \text{ рад/с,}$
 $\alpha = 45^\circ,$
 $AB = 25, BC = 10,$
 $BF = 80, FD = 20,$
 $NC = 15, EH = 30,$
 $FE = 35, FG = 25,$
 $OA = 30, KG = 25.$

Ответы

| | v_A | v_B | v_C | v_D | v_E | v_F | v_G | v_H |
|----|----------|----------|----------|----------|----------|---------|---------|----------|
| 1 | 30.000 | 27.042 | 25.981 | 7.500 | 67.086 | 17.299 | 18.000 | 56.250 |
| 2 | 40.000 | 29.814 | 28.284 | 9.428 | 27.487 | 16.997 | 20.000 | 37.712 |
| 3 | 375.000 | 265.165 | 285.591 | 106.066 | 103.078 | 53.033 | 75.000 | 35.355 |
| 4 | 120.000 | 103.923 | 120.000 | 60.000 | 216.333 | 207.846 | 240.000 | 180.000 |
| 5 | 144.338 | 127.294 | 125.000 | 24.056 | 109.746 | 66.970 | 72.169 | 126.295 |
| 6 | 120.000 | 103.923 | 108.167 | 30.000 | 66.813 | 51.962 | 60.000 | 72.000 |
| 7 | 210.000 | 189.291 | 181.865 | 52.500 | 105.000 | 105.000 | 105.000 | 0.000 |
| 8 | 400.000 | 282.843 | 894.427 | 848.528 | 254.951 | 141.421 | 200.000 | 353.553 |
| 9 | 180.000 | 155.885 | 162.250 | 45.000 | 40.088 | 31.177 | 36.000 | 7.200 |
| 10 | 1250.000 | 1082.532 | 1111.024 | 250.000 | 278.388 | 216.506 | 250.000 | 50.000 |
| 11 | 220.000 | 190.526 | 381.051 | 330.000 | 137.830 | 114.315 | 132.000 | 143.000 |
| 12 | 200.000 | 173.205 | 200.000 | 100.000 | 283.119 | 259.808 | 300.000 | 37.500 |
| 13 | 650.000 | 562.917 | 577.733 | 130.000 | 361.905 | 281.458 | 325.000 | 390.000 |
| 14 | 494.975 | 368.932 | 350.000 | 116.667 | 264.502 | 210.324 | 247.487 | 373.333 |
| 15 | 300.000 | 264.575 | 259.808 | 50.000 | 187.350 | 139.194 | 150.000 | 60.000 |
| 16 | 2262.742 | 1600.000 | 1723.253 | 640.000 | 550.549 | 320.000 | 452.548 | 768.000 |
| 17 | 510.000 | 441.673 | 453.298 | 102.000 | 283.956 | 220.836 | 255.000 | 51.000 |
| 18 | 360.000 | 268.328 | 254.558 | 84.853 | 247.386 | 152.971 | 180.000 | 84.853 |
| 19 | 380.000 | 329.090 | 342.527 | 95.000 | 365.363 | 263.272 | 304.000 | 101.333 |
| 20 | 400.000 | 346.410 | 360.555 | 100.000 | 576.628 | 173.205 | 200.000 | 650.000 |
| 21 | 1454.923 | 1260.000 | 2520.000 | 2182.384 | 686.527 | 630.000 | 727.461 | 90.933 |
| 22 | 440.000 | 381.051 | 396.611 | 110.000 | 244.982 | 190.526 | 220.000 | 44.000 |
| 23 | 460.000 | 325.269 | 1028.591 | 975.807 | 295.999 | 81.317 | 115.000 | 365.928 |
| 24 | 1200.000 | 1039.230 | 1066.583 | 240.000 | 668.132 | 519.615 | 600.000 | 720.000 |
| 25 | 2886.751 | 2500.000 | 2602.082 | 721.688 | 693.889 | 500.000 | 577.350 | 192.450 |
| 26 | 1300.000 | 1125.833 | 1155.465 | 260.000 | 1874.041 | 562.917 | 650.000 | 2112.500 |
| 27 | 572.756 | 426.907 | 405.000 | 135.000 | 100.446 | 157.436 | 114.551 | 140.400 |
| 28 | 1166.667 | 1010.363 | 2020.726 | 1750.000 | 660.611 | 606.218 | 700.000 | 87.500 |
| 29 | 502.295 | 442.982 | 435.000 | 83.716 | 301.842 | 233.055 | 251.147 | 83.716 |
| 30 | 636.396 | 468.007 | 450.000 | 128.571 | 198.949 | 156.941 | 127.279 | 267.429 |