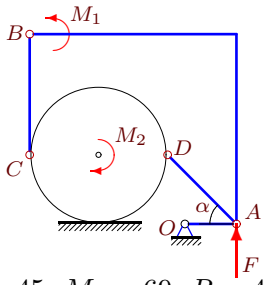
Принцип возможных перемещений (2)

Механизм с идеальными стационарными связями находится в равновесии под действием силы F и моментов M_1, M_2. Длины звеньев даны в сантиметрах. Стержни, направление которых не указано, считать горизонтальными или вертикальными. Диск касается горизонтальной поверхности без проскальзывания. Найти величину F.

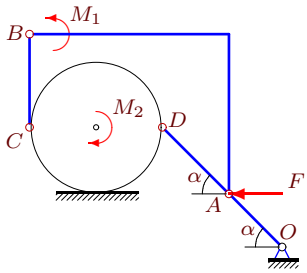
Кирсанов М.Н. **Решебник. Теоретическая механика**/Под ред. А. И. Кириллова.– М.: ФИЗМАТЛИТ, 2008. — 384 с. (с.158.)

Задача 34.1. 12



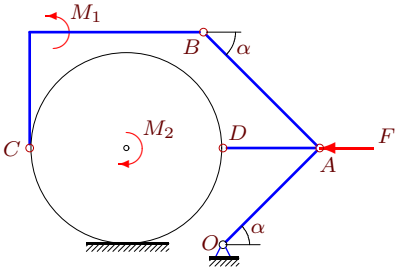
$M_1 = 45$, $M_2 = 69$, $R = 4$, $OA = 3$, $AD = 4\sqrt{2}$, $BC = 7$, $\alpha = 45°$.

Задача 34.2. 12



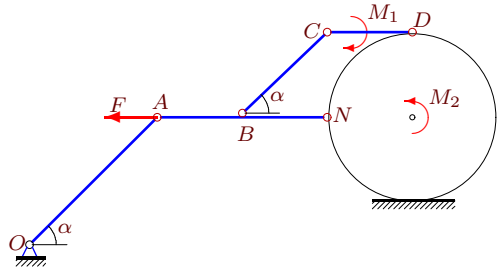
$M_1 = 420$, $M_2 = 448$, $R = 5$, $OA = 4\sqrt{2}$, $AD = 5\sqrt{2}$, $BC = 7$, $\alpha = 45°$.

Задача 34.3. 12



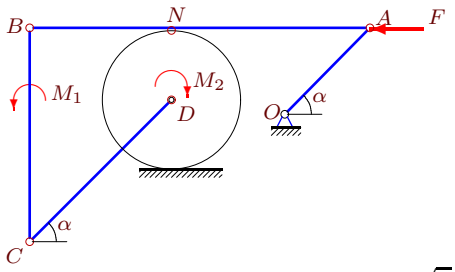
$M_1 = 27$, $M_2 = 58$, $R = 5$, $OA = 5\sqrt{2}$, $AB = 6\sqrt{2}$, $AD = 5$, $\alpha = 45°$.

Задача 34.4. 12



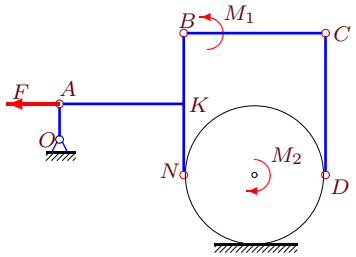
$M_1 = 33$, $M_2 = 39$, $R = 4$, $OA = 6\sqrt{2}$, $AB = 4$, $BN = 4$, $BC = 4\sqrt{2}$, $CD = 4$, α=45°

Задача 34.5. 12



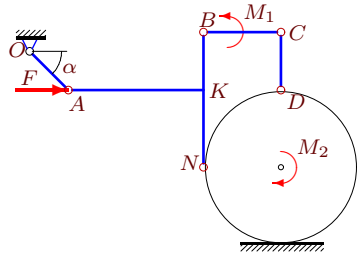
$M_1 = 399$, $M_2 = 193$, $R = 5$, $OA = 6\sqrt{2}$, $CD = 10\sqrt{2}$, $AN = 14$, $AB = 24$, $\alpha = 45°$.

Задача 34.6. 12



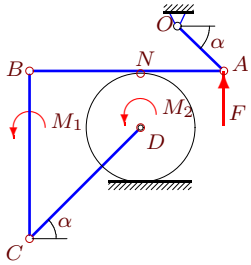
$M_1 = 17$, $M_2 = 41$, $R = 4$, $OA = 2$, $AK = 7$, $BK = 4$, $KN = 4$, $CD = 8$.

Задача 34.7. 12



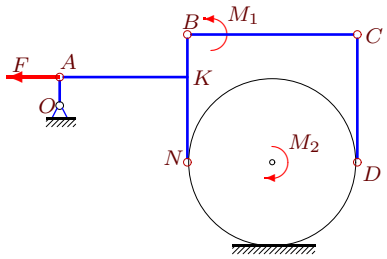
$M_1 = 27$, $M_2 = 51$, $R = 4$, $OA = 2\sqrt{2}$, $AK = 7$, $BK = 3$, $KN = 4$, $CD = 3$, $\alpha = 45°$.

Задача 34.8. 12



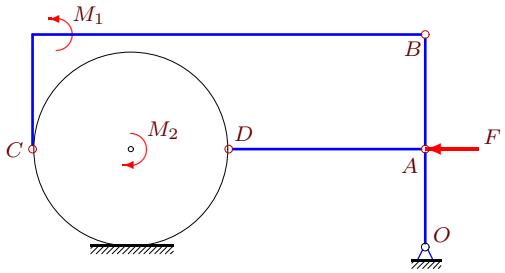
$M_1 = 45$, $M_2 = 25$, $R = 6$, $OA = 5\sqrt{2}$, $CD = 12\sqrt{2}$, $AN = 9$, $AB = 21$, $\alpha = 45°$.

Задача 34.9. 12



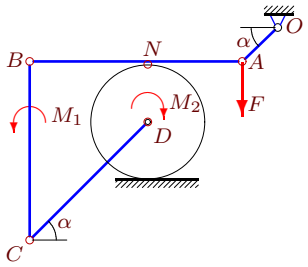
$M_1 = 27$, $M_2 = 33$, $R = 6$, $OA = 2$,
$AK = 9$, $BK = 3$, $KN = 6$, $CD = 9$.

Задача 34.10. 12



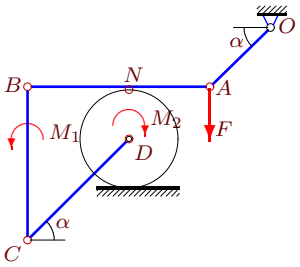
$M_1 = 68$, $M_2 = 119$, $R = 6$, $OA = 6$,
$AB = 7$, $AD = 12$.

Задача 34.11. 12



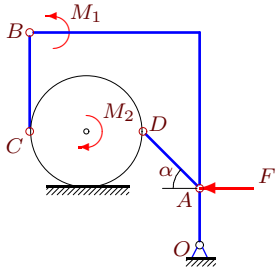
$M_1 = 492$, $M_2 = 134$, $R = 5$, $OA = 3\sqrt{2}$,
$CD = 10\sqrt{2}$, $AN = 8$, $AB = 18$, $\alpha = 45°$.

Задача 34.12. 12



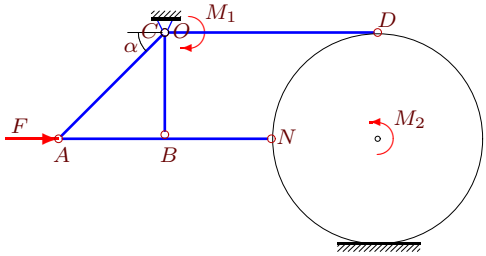
$M_1 = 132$, $M_2 = 134$, $R = 5$, $OA = 6\sqrt{2}$,
$CD = 10\sqrt{2}$, $AN = 8$, $AB = 18$, $\alpha = 45°$.

Задача 34.13. 12



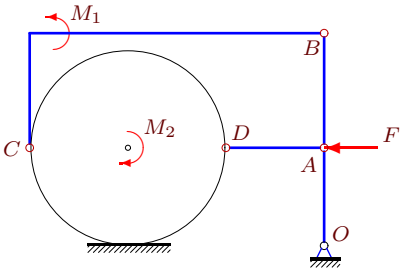
$M_1 = 315$, $M_2 = 497$, $R = 4$, $OA = 4$,
$AD = 4\sqrt{2}$, $BC = 7$, $\alpha = 45°$.

Задача 34.14. 12



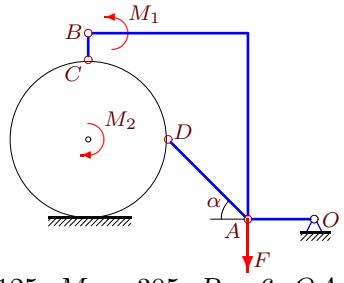
$M_1 = 16$, $M_2 = 20$, $R = 5$, $OA = 5\sqrt{2}$,
$AB = 5$, $BN = BC = 5$, $CD = 10$, α=45°

Задача 34.15. 12



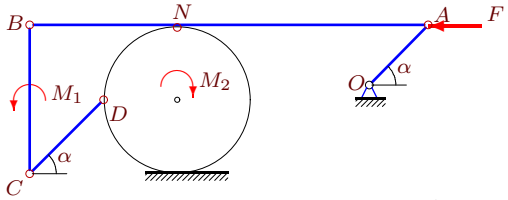
$M_1 = 51$, $M_2 = 89$, $R = 6$, $OA = 6$,
$AB = 7$, $AD = 6$.

Задача 34.16. 12



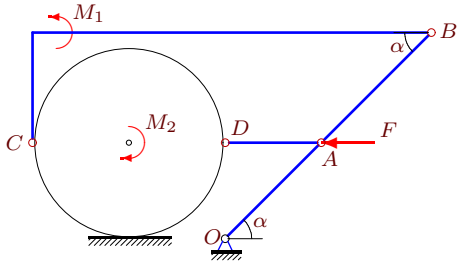
$M_1 = 125$, $M_2 = 305$, $R = 6$, $OA = 5$,
$AD = 6\sqrt{2}$, $BC = 2$, $\alpha = 45°$.

Задача 34.17. 12



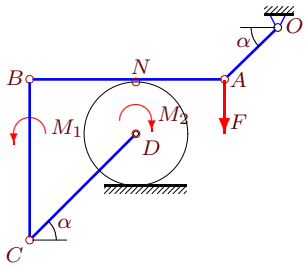
$M_1 = 306$, $M_2 = 660$, $R = 5$, $OA = 4\sqrt{2}$,
$CD = 5\sqrt{2}$, $AN = 17$, $AB = 27$, $\alpha = 45°$.

Задача 34.18. 12



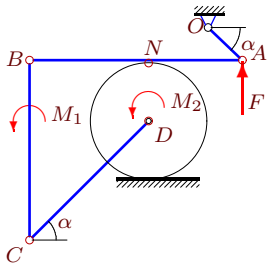
$M_1 = 39$, $M_2 = 124$, $R = 7$, $OA = 7\sqrt{2}$,
$AB = 8\sqrt{2}$, $AD = 7$, $\alpha = 45°$.

Задача 34.19. 12



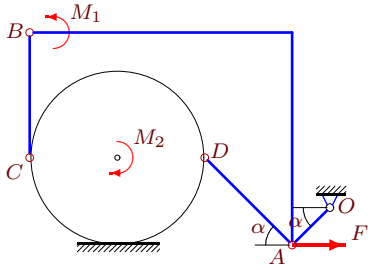
$M_1 = 195,\ M_2 = 377,\ R = 6,\ OA = 6\sqrt{2},$
$CD = 12\sqrt{2},\ AN = 10,\ AB = 22,\ \alpha = 45°.$

Задача 34.20. 12



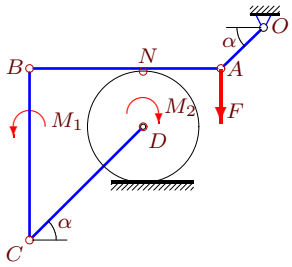
$M_1 = 66,\ M_2 = 34,\ R = 7,\ OA = 4\sqrt{2},$
$CD = 14\sqrt{2},\ AN = 11,\ AB = 25,\ \alpha = 45°.$

Задача 34.21. 12



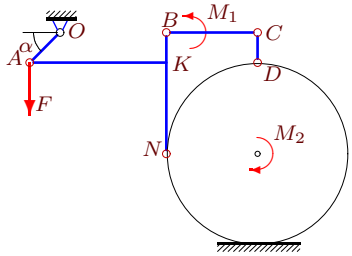
$M_1 = 540,\ M_2 = 640,\ R = 7,\ OA = 3\sqrt{2},$
$AD = 7\sqrt{2},\ BC = 10,\ \alpha = 45°.$

Задача 34.22. 12



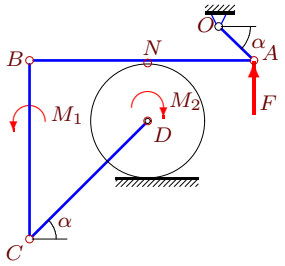
$M_1 = 561,\ M_2 = 43,\ R = 8,\ OA = 6\sqrt{2},$
$CD = 16\sqrt{2},\ AN = 11,\ AB = 27,\ \alpha = 45°.$

Задача 34.23. 12



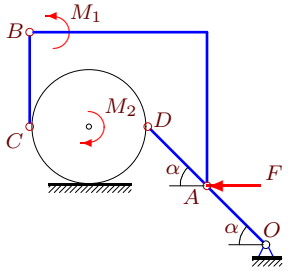
$M_1 = 23,\ M_2 = 41,\ R = 6,\ OA = 2\sqrt{2},$
$AK = 9,\ BK = 2,\ KN = 6,\ CD = 2,\ \alpha = 45°.$

Задача 34.24. 12



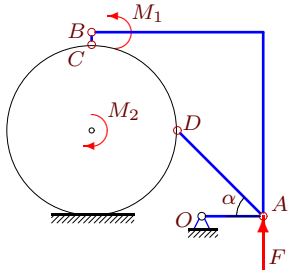
$M_1 = 27,\ M_2 = 259,\ R = 5,\ OA = 3\sqrt{2},$
$CD = 10\sqrt{2},\ AN = 9,\ AB = 19,\ \alpha = 45°.$

Задача 34.25. 12



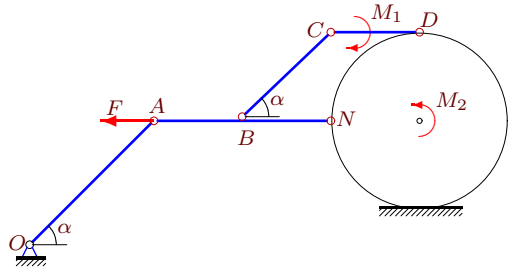
$M_1 = 240,\ M_2 = 244,\ R = 5,\ OA = 5\sqrt{2},$
$AD = 5\sqrt{2},\ BC = 8,\ \alpha = 45°.$

Задача 34.26. 12



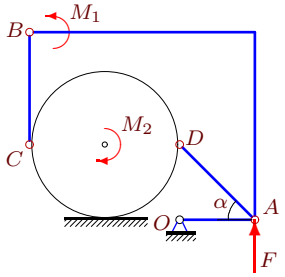
$M_1 = 135,\ M_2 = 415,\ R = 7,\ OA = 5,$
$AD = 7\sqrt{2},\ BC = 1,\ \alpha = 45°.$

Задача 34.27. 12



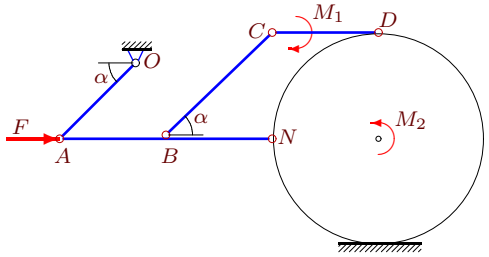
$M_1 = 98,\ M_2 = 147,\ R = 5,\ OA = 7\sqrt{2},$
$AB = 5,\ BN = 5,\ BC = 5\sqrt{2},\ CD = 5,\ \alpha{=}45°$

Задача 34.28. 12



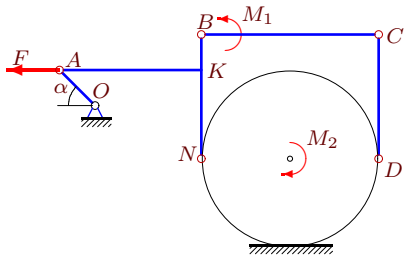
$M_1 = 15,\ M_2 = 23,\ R = 4,\ OA = 4,$
$AD = 4\sqrt{2},\ BC = 6,\ \alpha = 45°.$

Задача 34.29.



$M_1 = 110$, $M_2 = 205$, $R = 7$, $OA = 5\sqrt{2}$,
$AB = 7$, $BN = 7$, $BC = 7\sqrt{2}$, $CD = 7$, α=45°

Задача 34.30.



$M_1 = 38$, $M_2 = 48$, $R = 5$, $OA = 2\sqrt{2}$,
$AK = 8$, $BK = 2$, $KN = 5$, $CD = 7$, $\alpha = 45°$.

34.12

Принцип возможных перемещений (2)

№	ω_{AB_z}	ω_{BC_z}	ω_{CD_z}	ω_{DA_z}	$\omega_{\text{диск}_z}$	ω_{OA_z}	F
1	3	3	–	3	3	8	3
2	-28	12	–	-84	0	105	28
3	2	2	–	0	3	3	8
4	-3	3	-3	–	3	2	−18
5	15	17	15	–	21	35	−13
6	-4	7	-4	–	7	6	14
7	0	-3	4	–	-3	6	−6
8	60	25	60	–	-45	108	0
9	-2	3	-2	–	3	3	3
10	1	1	–	-2	4	4	17
11	-15	-14	-15	–	-12	40	44
12	-15	-14	-15	–	-12	20	2
13	7	23	–	-21	21	42	49
14	1	-1	0	–	-1	1	4
15	1	1	–	-3	3	3	12
16	-5	-5	–	-5	-5	12	−15
17	20	20	6	–	34	85	48
18	2	2	–	0	3	3	14
19	-18	-17	-18	–	-15	30	−13
20	84	34	84	–	-66	231	0
21	-10	-17	–	0	-15	35	−40
22	-48	-43	-48	–	-33	88	43
23	4	-5	31	–	-5	3	−15
24	30	11	30	–	-27	90	−27
25	-4	1	–	-12	0	12	16
26	5	5	–	5	5	14	20
27	-7	7	-7	–	7	5	−49
28	1	1	–	1	1	2	1
29	5	-5	5	–	-5	7	45
30	0	2	0	–	2	5	2