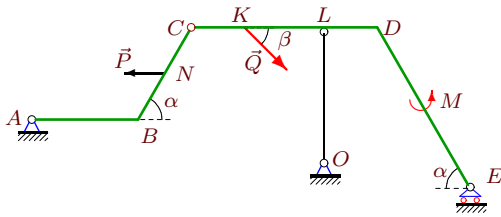# Составная конструкция

Определить реакции опор конструкции (в кН), состоящей из двух тел. Конструкция расположена в вертикальной плоскости. Дан погонный вес ρ.
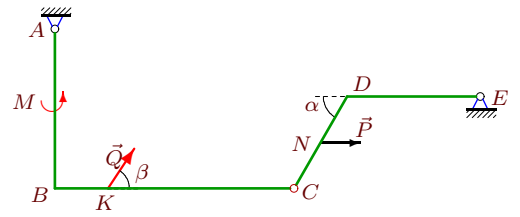
Задача S7.1.

$P = 5$ кН, $Q = 5$ кН, $M = 3$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 4$ м, $BC = 4$ м, $CD = 7$ м,
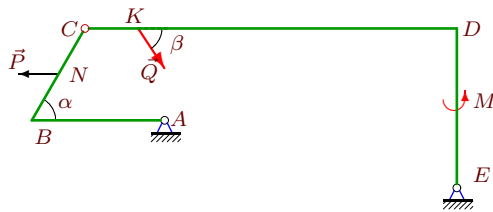$DE = 7$ м, $CN = 2$ м, $CK = 2$ м. $LD = 2$ м

Задача S7.2.

$P = 6$ кН, $Q = 9$ кН, $M = 7$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 60°$,
$AB = 6$ м, $BC = 9$ м, $CD = 4$ м,
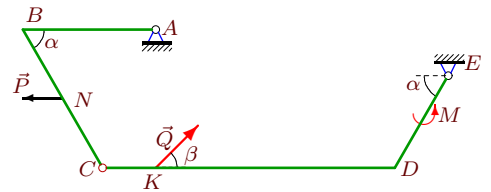$DE = 5$ м, $CN = 2$ м, $BK = 2$ м.

Задача S7.3.

$P = 7$ кН, $Q = 1$ кН, $M = 9$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 5$ м, $BC = 4$ м, $CD = 14$ м,
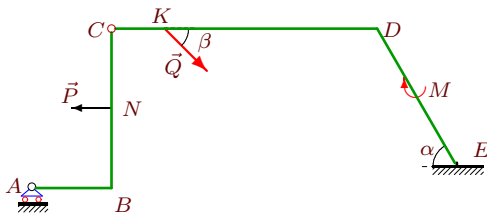$DE = 6$ м, $CN = 2$ м, $CK = 2$ м.

Задача S7.4.

$P = 5$ кН, $Q = 3$ кН, $M = 5$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 5$ м, $BC = 6$ м, $CD = 11$ м,
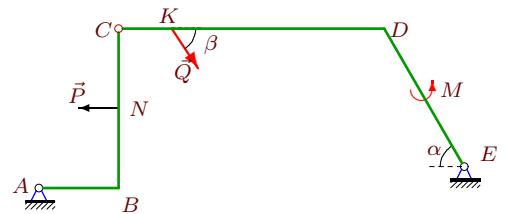$DE = 4$ м, $CN = 3$ м, $CK = 2$ м.

Задача S7.5.

$P = 7$ кН, $Q = 6$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 3$ м, $BC = 6$ м, $CD = 10$ м,
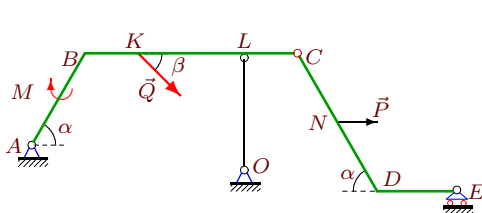$DE = 6$ м, $CN = 3$ м, $CK = 2$ м.

Задача S7.6.

$P = 7$ кН, $Q = 7$ кН, $M = 9$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 3$ м, $BC = 6$ м, $CD = 10$ м,
$DE = 6$ м, $CN = 3$ м, $CK = 2$ м.

Задача S7.7.

$P = 6$ кН, $Q = 4$ кН, $M = 6$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 4$ м, $BC = 8$ м, $CD = 6$ м,
$DE = 3$ м, $CN = 3$ м, $BK = 2$ м. $LC = 2$ м.

Задача S7.8.

$P = 9$ кН, $Q = 1$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 75°$,
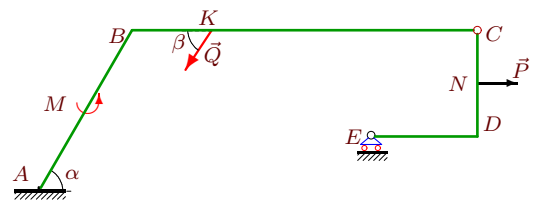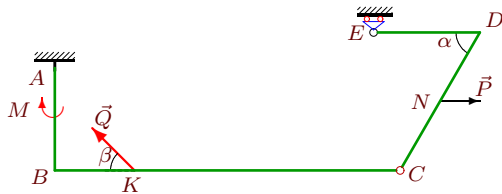$AB = 7$ м, $BC = 13$ м, $CD = 4$ м,
$DE = 4$ м, $CN = 2$ м, $BK = 3$ м.

$P = 6$ кН, $Q = 8$ кН, $M = 9$ кНм,
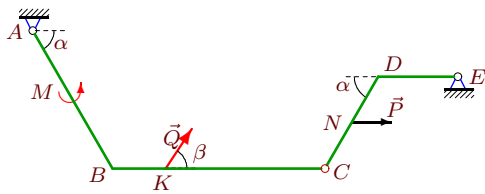$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 4$ м, $BC = 13$ м, $CD = 6$ м,
$DE = 4$ м, $CN = 3$ м, $BK = 3$ м.

$P = 5$ кН, $Q = 8$ кН, $M = 3$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 4$ м, $BC = 6$ м, $CD = 10$ м,
$DE = 4$ м, $CN = 3$ м, $CK = 2$ м.

$P = 6$ кН, $Q = 5$ кН, $M = 7$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 60°$,
$AB = 6$ м, $BC = 8$ м, $CD = 4$ м,
$DE = 3$ м, $CN = 2$ м, $BK = 2$ м.

$P = 6$ кН, $Q = 7$ кН, $M = 3$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 6$ м, $BC = 9$ м, $CD = 4$ м,
$DE = 5$ м, $CN = 2$ м, $BK = 2$ м.
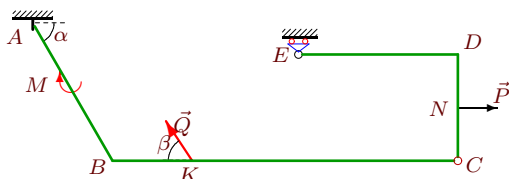
$P = 8$ кН, $Q = 2$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 60°$,
$AB = 6$ м, $BC = 13$ м, $CD = 4$ м,
$DE = 6$ м, $CN = 2$ м, $BK = 3$ м.

$P = 5$ кН, $Q = 6$ кН, $M = 3$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 5$ м, $BC = 6$ м, $CD = 10$ м,
$DE = 6$ м, $CN = 3$ м, $CK = 2$ м.
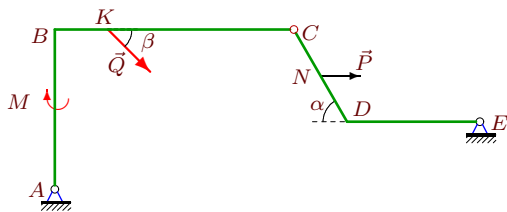
$P = 4$ кН, $Q = 8$ кН, $M = 3$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 6$ м, $BC = 9$ м, $CD = 4$ м,
$DE = 5$ м, $CN = 2$ м, $BK = 2$ м.
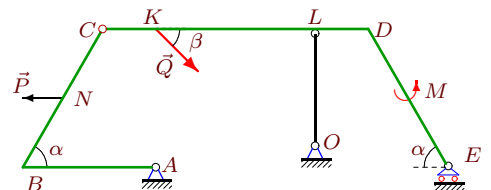
$P = 6$ кН, $Q = 5$ кН, $M = 5$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 5$ м, $BC = 6$ м, $CD = 10$ м,
$DE = 6$ м, $CN = 3$ м, $CK = 2$ м. $LD = 2$ м

Задача S7.17.
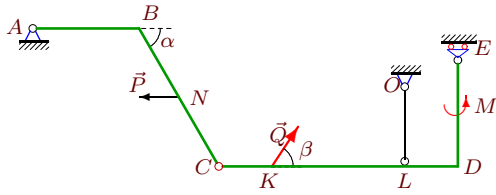
$P = 8$ кН, $Q = 2$ кН, $M = 9$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 4$ м, $BC = 6$ м, $CD = 9$ м,
$DE = 4$ м, $CN = 3$ м, $CK = 2$ м. $LD = 2$ м

Задача S7.18.
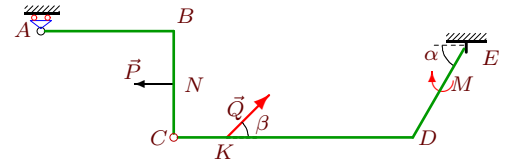
$P = 7$ кН, $Q = 8$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 5$ м, $BC = 4$ м, $CD = 9$ м,
$DE = 4$ м, $CN = 2$ м, $CK = 2$ м.

Задача S7.19.
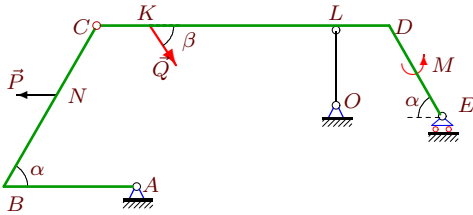
$P = 8$ кН, $Q = 3$ кН, $M = 9$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 5$ м, $BC = 7$ м, $CD = 11$ м,
$DE = 4$ м, $CN = 3$ м, $CK = 2$ м. $LD = 2$ м

Задача S7.20.
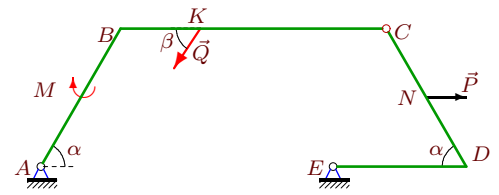
$P = 7$ кН, $Q = 4$ кН, $M = 3$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 6$ м, $BC = 10$ м, $CD = 6$ м,
$DE = 5$ м, $CN = 3$ м, $BK = 3$ м.

Задача S7.21.
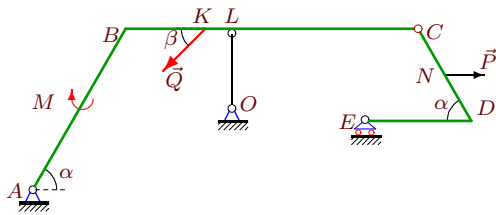
$P = 6$ кН, $Q = 3$ кН, $M = 6$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 45°$,
$AB = 7$ м, $BC = 11$ м, $CD = 4$ м,
$DE = 4$ м, $CN = 2$ м, $BK = 3$ м. $LC = 7$ м.

Задача S7.22.
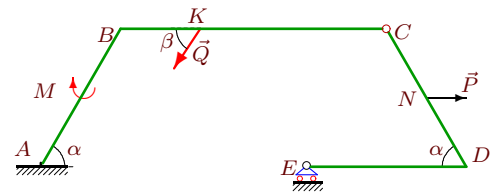
$P = 8$ кН, $Q = 4$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 60°$,
$AB = 6$ м, $BC = 10$ м, $CD = 6$ м,
$DE = 6$ м, $CN = 3$ м, $BK = 3$ м.

Задача S7.23.
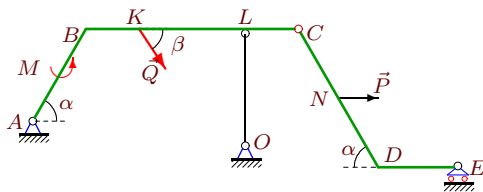
$P = 7$ кН, $Q = 6$ кН, $M = 7$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 60°$,
$AB = 4$ м, $BC = 8$ м, $CD = 6$ м,
$DE = 3$ м, $CN = 3$ м, $BK = 2$ м. $LC = 2$ м.

Задача S7.24.
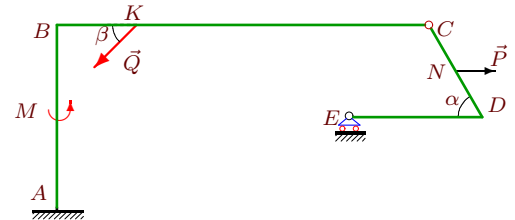
$P = 6$ кН, $Q = 9$ кН, $M = 3$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 7$ м, $BC = 14$ м, $CD = 4$ м,
$DE = 5$ м, $CN = 2$ м, $BK = 3$ м.

Задача S7.25.
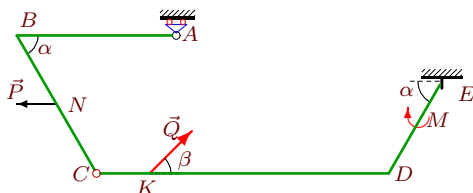
$P = 6$ кН, $Q = 4$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 6$ м, $BC = 6$ м, $CD = 11$ м,
$DE = 4$ м, $CN = 3$ м, $CK = 2$ м.

Задача S7.26.

$P = 6$ кН, $Q = 9$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 4$ м, $BC = 7$ м, $CD = 14$ м,
$DE = 4$ м, $CN = 3$ м, $CK = 2$ м.

Задача S7.27.

$P = 4$ кН, $Q = 8$ кН, $M = 3$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 4$ м, $BC = 13$ м, $CD = 6$ м,
$DE = 4$ м, $CN = 3$ м, $BK = 3$ м.

Задача S7.28.

$P = 6$ кН, $Q = 2$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 6$ м, $BC = 13$ м, $CD = 6$ м,
$DE = 4$ м, $CN = 3$ м, $BK = 3$ м.
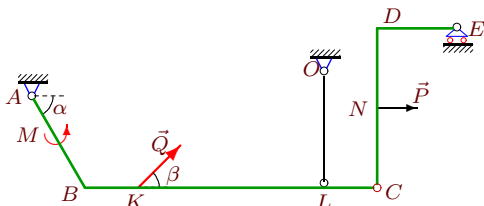
Задача S7.29.

$P = 5$ кН, $Q = 1$ кН, $M = 3$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 30°$,
$AB = 4$ м, $BC = 11$ м, $CD = 6$ м,
$DE = 3$ м, $CN = 3$ м, $BK = 2$ м. $LC = 2$ м.

Задача S7.30.

$P = 7$ кН, $Q = 6$ кН, $M = 3$ кНм,
$\rho = 1$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 6$ м, $BC = 10$ м, $CD = 6$ м,
$DE = 6$ м, $CN = 3$ м, $BK = 3$ м.
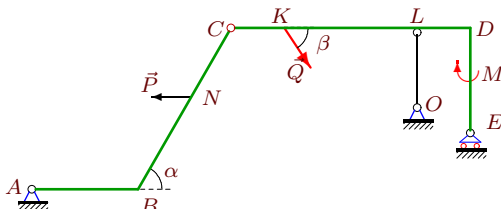
Задача S7.31.

$P = 8$ кН, $Q = 1$ кН, $M = 6$ кНм,
$\rho = 2$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 4$ м, $BC = 7$ м, $CD = 9$ м,
$DE = 4$ м, $CN = 3$ м, $CK = 2$ м. $LD = 2$ м
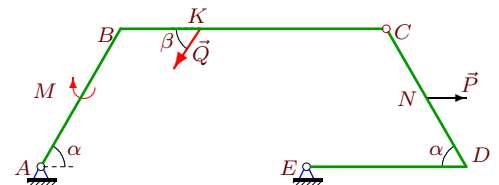
Задача S7.32.
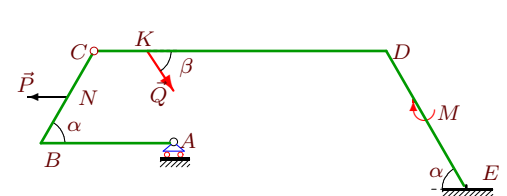
$P = 9$ кН, $Q = 6$ кН, $M = 9$ кНм,
$\rho = 3$ кН/м, $\alpha = 60°$, $\beta = 75°$,
$AB = 5$ м, $BC = 4$ м, $CD = 11$ м,
$DE = 6$ м, $CN = 2$ м, $CK = 2$ м.

	X_A	Y_A	X_E	Y_E	S_{OL}	M
1	0.670	5.610	—	-5.627	46.517	
2	-9.398	11.481	-1.102	4.725	—	
3	-23.162	30.286	29.903	-0.320	—	
4	11.889	18.645	-9.011	5.234	—	
5	—	-2.500	2.757	81.743	—	-702.497
6	12.432	19.364	-7.244	12.397	—	
7	-8.828	4.567	—	4.902	35.360	
8	-8.741	74.466	—	10.500	—	699.769
9	0.928	131.588	—	-54.588	—	1353.863
10	-3.154	10.482	2.498	7.862	—	
11	-9.625	10.912	1.125	5.758	—	
12	-12.062	55.658	—	12.842	—	166.551
13	-7.000	78.935	—	6.333	—	738.401
14	-9.445	25.283	10.202	5.960	—	
15	5.612	17.019	-16.540	10.981	—	
16	2.464	-10.109	—	-60.216	127.861	
17	7.482	5.701	—	-64.218	102.585	
18	—	10.300	1.343	50.043	—	-306.636
19	7.224	-38.337	—	-160.830	256.065	
20	-14.562	5.183	8.598	25.681	—	
21	-3.879	-11.136	—	1.196	64.061	
22	-6.000	89.536	—	-2.072	—	822.895
23	-10.000	6.760	—	4.469	35.967	
24	1.794	92.536	—	1.964	—	642.443
25	—	-14.196	2.536	93.196	—	-872.265
26	—	10.500	-1.794	81.000	—	-797.785
27	11.131	3.767	-8.203	19.233	—	
28	-4.268	77.500	—	10.500	—	746.677
29	-5.866	14.256	—	8.000	25.244	
30	-21.109	3.606	15.662	30.189	—	
31	7.741	12.619	—	-46.748	83.094	
32	—	3.696	7.447	80.099	—	-732.997

S7 файл   o7s3B

1	$16.5 \cdot Y_E + 11 \cdot S - 418.84 = 0$; $10.5 \cdot Y_E + 5 \cdot S - 173.5 = 0$.
2	$-3.46 \cdot X_E + 7 \cdot Y_E - 36.9 = 0$; $2.54 \cdot X_E + 16 \cdot Y_E - 72.8 = 0$.
3	$3.46 \cdot X_A + 3 \cdot Y_A - 10.62 = 0$; $-2.54 \cdot X_A - 11 \cdot Y_A + 274.41 = 0$.
4	$-5.2 \cdot X_A + 2 \cdot Y_A + 24.49 = 0$; $-1.73 \cdot X_A - 11 \cdot Y_A + 225.68 = 0$.
5	$Y_A = -7.5/(3)$; $M_E = -662.5 + Y_A(16)$
6	$6 \cdot X_A - 3 \cdot Y_A - 16.5 = 0$; $0.8 \cdot X_A - 16 \cdot Y_A + 299.84 = 0$.
7	$-6 \cdot Y_E = 15.59 - 45$; $8 \cdot Y_A = 8 \cdot Y_E + 3.46 - 376.6$;
8	$4 \cdot Y_E = 18 + 24$; $M_A = 831.02 - 12.5 \cdot Y_E$;
9	$1 \cdot Y_E = -15.59 - 39$; $M_A = 698.8 - 12 \cdot Y_E$;
10	$-6 \cdot X_A - 4 \cdot Y_A + 23 = 0$; $-2.54 \cdot X_A - 16 \cdot Y_A + 159.7 = 0$.
11	$-3.46 \cdot X_E + 5 \cdot Y_E - 24.9 = 0$; $1.73 \cdot X_E + 16 \cdot Y_E - 94.07 = 0$.
12	$-7 \cdot Y_E = -10.4 - 79.5$; $M_A = 372.02 - 16 \cdot Y_E$;
13	$6 \cdot Y_E = -16 + 54$; $M_A = 801.73 - 10 \cdot Y_E$;
14	$5.2 \cdot X_A + 2 \cdot Y_A - 1.49 = 0$; $0 \cdot X_A - 11 \cdot Y_A + 278.11 = 0$.
15	$3.46 \cdot X_E + 7 \cdot Y_E - 19.57 = 0$; $-2.54 \cdot X_E + 16 \cdot Y_E - 217.64 = 0$.
16	$11 \cdot Y_E + 6 \cdot S - 104.78 = 0$; $13 \cdot Y_E + 8 \cdot S - 240.07 = 0$.
17	$16 \cdot Y_E + 14 \cdot S - 408.7 = 0$; $9 \cdot Y_E + 7 \cdot S - 140.14 = 0$.
18	$Y_A = 51.5/(5)$; $M_E = -471.44 + Y_A(16)$
19	$11.5 \cdot Y_E + 7.5 \cdot S - 70.94 = 0$; $13 \cdot Y_E + 9 \cdot S - 213.8 = 0$.
20	$5.2 \cdot X_E - 2 \cdot Y_E + 6.69 = 0$; $-0 \cdot X_E + 11 \cdot Y_E - 282.49 = 0$.
21	$2 \cdot Y_E = 10.4 - 8$; $7.5 \cdot Y_A = 5 \cdot Y_E + 6.06 - 495.41$;
22	$3 \cdot Y_E = 20.78 - 27$; $M_A = 802.18 - 10 \cdot Y_E$;
23	$-6 \cdot Y_E = 18.19 - 45$; $8 \cdot Y_A = 8 \cdot Y_E + 3.46 - 376.56$;
24	$3 \cdot Y_E = 10.4 - 4.5$; $M_A = 664.05 - 11 \cdot Y_E$;
25	$Y_A = 42.59/(-3)$; $M_E = -730.3 + Y_A(10)$
26	$Y_A = -42/(-4)$; $M_E = -923.78 + Y_A(12)$
27	$-5.2 \cdot X_E - 1 \cdot Y_E - 23.4 = 0$; $-1.2 \cdot X_E + 12 \cdot Y_E - 240.6 = 0$.
28	$4 \cdot Y_E = 18 + 24$; $M_A = 872.68 - 12 \cdot Y_E$;
29	$-3 \cdot Y_E = -15 - 9$; $11 \cdot Y_A = 5 \cdot Y_E - 3.46 - 426$;
30	$5.2 \cdot X_E - 3 \cdot Y_E + 9.19 = 0$; $-0 \cdot X_E + 10 \cdot Y_E - 301.89 = 0$.
31	$16.5 \cdot Y_E + 14.5 \cdot S - 433.53 = 0$; $9 \cdot Y_E + 7 \cdot S - 160.93 = 0$.
32	$Y_A = -11.09/(-3)$; $M_E = -773.65 + Y_A(11)$