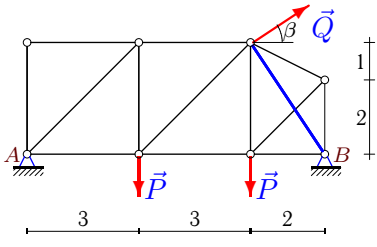
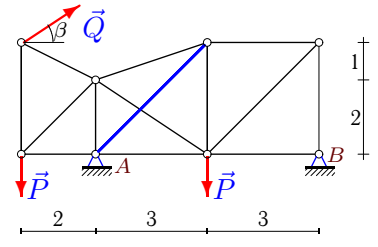
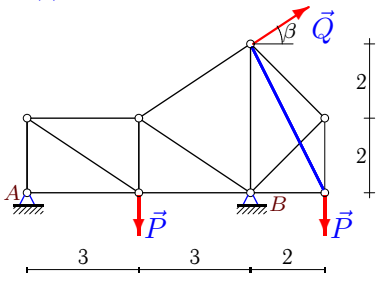
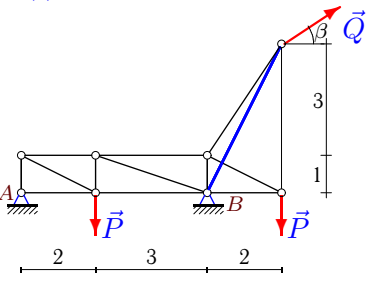
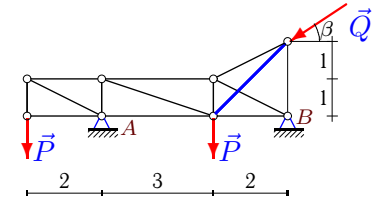
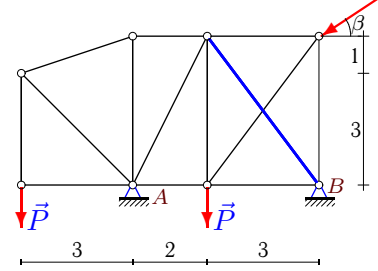
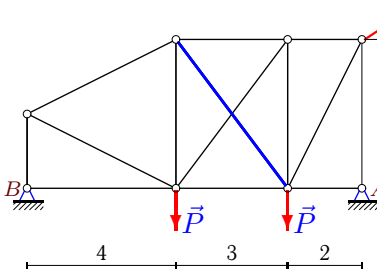
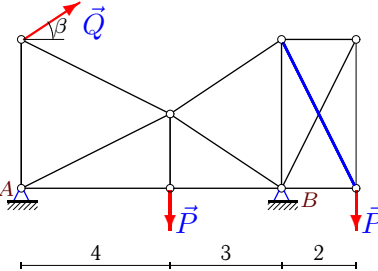
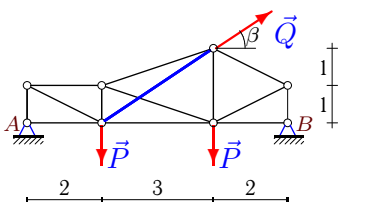
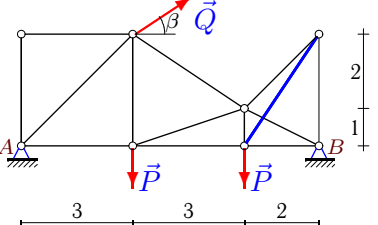


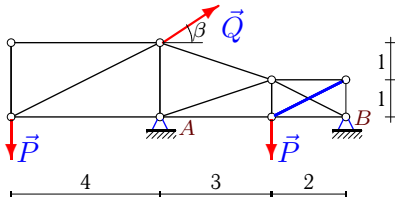
Расчет статически неопределимой фермы (2)

Найти реакции опор фермы и усилие S в дополнительном раскосе, выделенном утолщенной линией.

<p>Задача M24.1. 1</p>  <p style="text-align: right;">$P = 5 \text{ кН},$ $Q = 8 \text{ кН},$ $\beta = 45^\circ.$</p>	<p>Задача M24.2. 1</p>  <p style="text-align: right;">$P = 6 \text{ кН},$ $Q = 8 \text{ кН},$ $\beta = 15^\circ.$</p>
<p>Задача M24.3. 1</p>  <p style="text-align: right;">$P = 9 \text{ кН},$ $Q = 3 \text{ кН},$ $\beta = 30^\circ.$</p>	<p>Задача M24.4. 1</p>  <p style="text-align: right;">$P = 9 \text{ кН},$ $Q = 5 \text{ кН},$ $\beta = 15^\circ.$</p>
<p>Задача M24.5. 1</p>  <p style="text-align: right;">$P = 13 \text{ кН},$ $Q = 9 \text{ кН},$ $\beta = 45^\circ.$</p>	<p>Задача M24.6. 1</p>  <p style="text-align: right;">$P = 11 \text{ кН},$ $Q = 7 \text{ кН},$ $\beta = 15^\circ.$</p>
<p>Задача M24.7. 1</p>  <p style="text-align: right;">$P = 10 \text{ кН},$ $Q = 7 \text{ кН},$ $\beta = 30^\circ.$</p>	<p>Задача M24.8. 1</p>  <p style="text-align: right;">$P = 10 \text{ кН},$ $Q = 8 \text{ кН},$ $\beta = 30^\circ.$</p>
<p>Задача M24.9. 1</p>  <p style="text-align: right;">$P = 5 \text{ кН},$ $Q = 9 \text{ кН},$ $\beta = 45^\circ.$</p>	<p>Задача M24.10. 1</p>  <p style="text-align: right;">$P = 9 \text{ кН},$ $Q = 7 \text{ кН},$ $\beta = 15^\circ.$</p>

Задача M24.11.

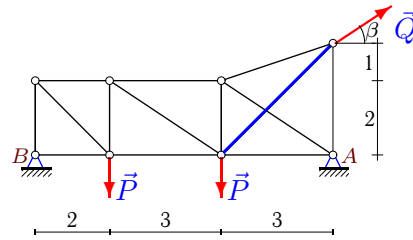
1



$P = 7 \text{ кН},$
 $Q = 9 \text{ кН},$
 $\beta = 15^\circ.$

Задача M24.12.

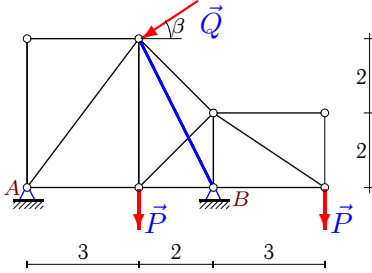
1



$P = 13 \text{ кН},$
 $Q = 6 \text{ кН},$
 $\beta = 45^\circ.$

Задача M24.13.

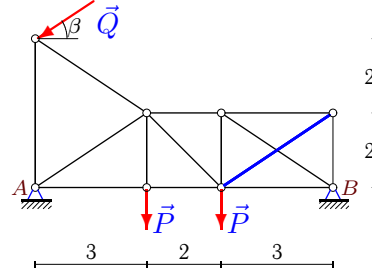
1



$P = 8 \text{ кН},$
 $Q = 5 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.14.

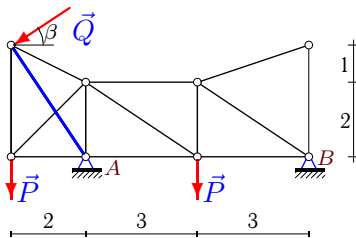
1



$P = 13 \text{ кН},$
 $Q = 5 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.15.

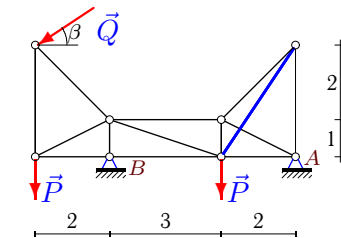
1



$P = 6 \text{ кН},$
 $Q = 4 \text{ кН},$
 $\beta = 15^\circ.$

Задача M24.16.

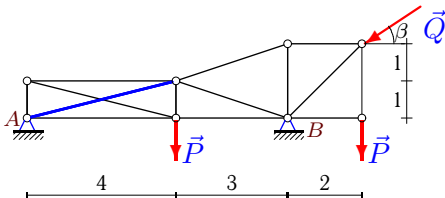
1



$P = 13 \text{ кН},$
 $Q = 3 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.17.

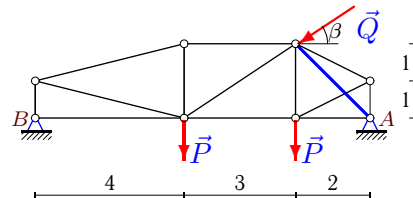
1



$P = 12 \text{ кН},$
 $Q = 9 \text{ кН},$
 $\beta = 45^\circ.$

Задача M24.18.

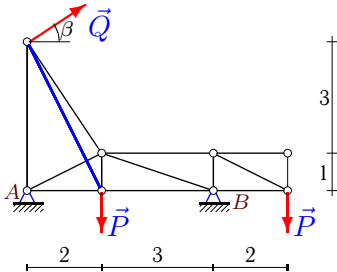
1



$P = 12 \text{ кН},$
 $Q = 7 \text{ кН},$
 $\beta = 15^\circ.$

Задача M24.19.

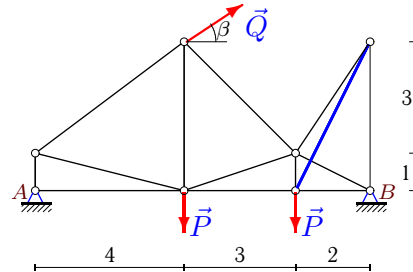
1



$P = 5 \text{ кН},$
 $Q = 8 \text{ кН},$
 $\beta = 45^\circ.$

Задача M24.20.

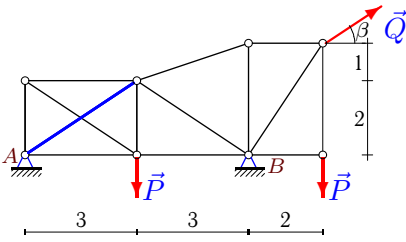
1



$P = 10 \text{ кН},$
 $Q = 6 \text{ кН},$
 $\beta = 15^\circ.$

Задача M24.21.

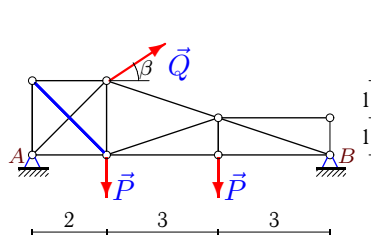
1



$P = 7 \text{ кН},$
 $Q = 5 \text{ кН},$
 $\beta = 45^\circ.$

Задача M24.22.

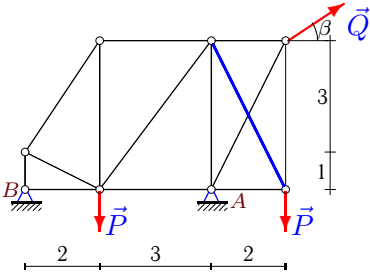
1



$P = 12 \text{ кН},$
 $Q = 7 \text{ кН},$
 $\beta = 45^\circ.$

Задача M24.23.

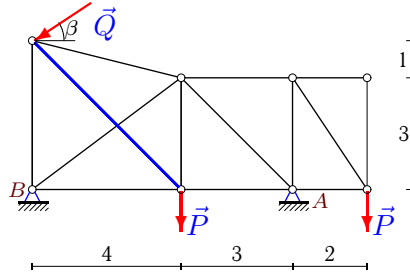
1



$P = 7 \text{ кН},$
 $Q = 4 \text{ кН},$
 $\beta = 15^\circ.$

Задача M24.24.

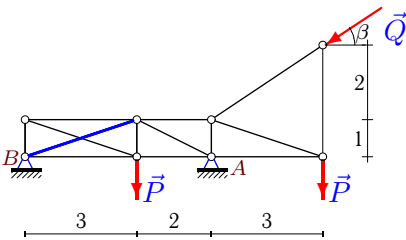
1



$P = 9 \text{ кН},$
 $Q = 8 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.25.

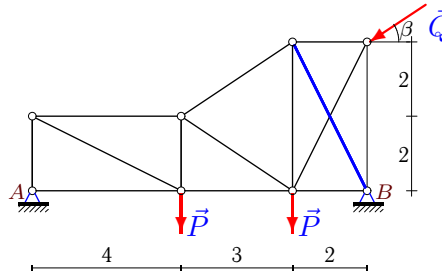
1



$P = 12 \text{ кН},$
 $Q = 3 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.26.

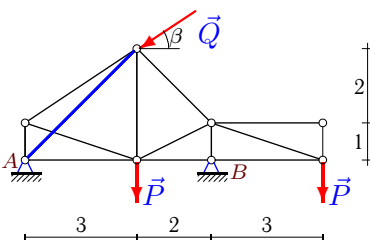
1



$P = 6 \text{ кН},$
 $Q = 8 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.27.

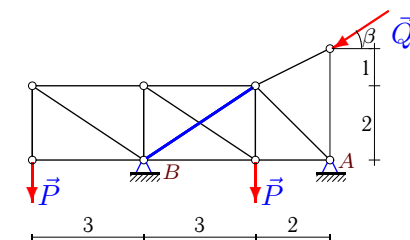
1



$P = 10 \text{ кН},$
 $Q = 9 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.28.

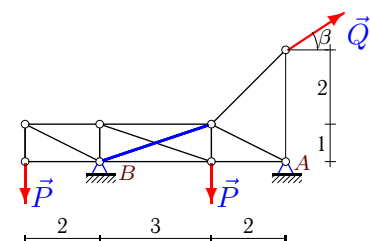
1



$P = 7 \text{ кН},$
 $Q = 6 \text{ кН},$
 $\beta = 15^\circ.$

Задача M24.29.

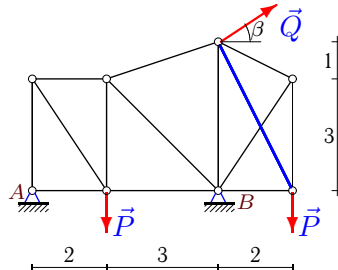
1



$P = 7 \text{ кН},$
 $Q = 7 \text{ кН},$
 $\beta = 30^\circ.$

Задача M24.30.

1



$P = 5 \text{ кН},$
 $Q = 6 \text{ кН},$
 $\beta = 30^\circ.$

М24 Ответы.**Расчет статически неопределимой фермы (2)**

16.06.2012

	δ_{11}	δ_{12}	δ_{22}	Δ_{1p}	Δ_{2p}	X_B	S	X_A	Y_A	Y_B
1	8.000	-1.109	9.129	26.496	12.348	-3.560	-1.785	-2.097	0.839	3.504
2	6.000	-2.121	11.770	22.985	-6.646	-3.878	-0.134	-3.849	4.376	5.554
3	6.000	-0.000	9.535	14.544	-25.037	-2.424	2.626	-0.174	-0.232	16.732
4	5.000	0.000	8.775	14.872	51.025	-2.974	-5.815	-1.855	-1.546	18.252
5	5.000	-1.414	7.374	-84.146	-7.157	18.085	4.439	-11.721	25.946	6.418
6	5.000	-1.800	17.280	-11.414	-123.760	5.050	7.688	1.711	29.609	-5.797
7	9.000	1.800	17.280	7.936	44.965	-0.369	-2.564	-5.693	11.417	5.083
8	7.000	0.000	16.144	61.569	-78.324	-8.796	4.851	1.867	-6.530	22.530
9	7.000	-2.496	11.009	40.001	-60.008	-4.102	4.521	-2.262	1.363	2.273
10	8.000	-1.109	7.745	152.717	-71.224	-18.175	6.593	11.414	4.207	11.981
11	5.000	-1.789	8.072	20.773	-20.949	-3.504	1.819	-5.189	9.593	2.077
12	8.000	2.121	11.770	-78.357	-124.446	7.342	9.250	-11.585	8.723	13.034
13	5.000	-0.894	9.535	-30.546	61.273	5.044	-5.953	-0.714	2.864	15.636
14	8.000	-2.496	12.596	119.194	-123.016	-12.633	7.263	16.963	17.665	10.835
15	6.000	-0.000	9.129	-44.239	60.850	7.373	-6.665	-3.509	14.312	-1.277
16	5.000	1.109	7.745	95.628	-5.596	-19.919	3.576	22.517	0.441	27.059
17	7.000	-3.881	15.893	-23.976	78.369	0.800	-4.736	5.564	1.714	28.650
18	9.000	1.414	7.374	-77.527	55.016	10.091	-9.397	-3.329	14.573	11.238
19	5.000	-0.894	8.775	77.882	-13.808	-15.579	-0.014	9.922	-9.182	13.525
20	9.000	-0.894	8.775	164.261	-69.451	-17.643	6.116	11.848	4.339	14.108
21	6.000	-2.496	12.596	23.812	-9.395	-3.987	-0.044	0.451	0.577	9.887
22	8.000	-1.414	9.657	216.000	-78.749	-26.238	4.312	21.288	8.550	10.500
23	5.000	0.000	16.144	20.538	-31.379	-4.108	1.944	0.244	14.242	-1.277
24	7.000	2.828	16.379	-32.785	-67.514	3.244	3.562	3.684	12.755	9.245
25	5.000	2.846	11.925	10.447	-37.174	-4.471	4.185	7.069	27.241	-1.741
26	9.000	-0.894	16.144	-2.022	37.303	-0.005	-2.311	6.933	7.746	8.254
27	5.000	-2.121	10.770	-83.383	50.725	16.017	-1.555	-8.223	4.477	20.023
28	5.000	2.496	12.596	21.068	122.813	0.726	-9.894	5.070	-1.924	17.477
29	5.000	2.846	11.925	58.224	35.412	-11.519	-0.220	5.457	1.537	8.963
30	5.000	-0.000	11.975	19.667	-27.455	-3.933	2.293	-1.263	-3.157	10.157

М24 файл о24m1В

В первой строке — усилия от действия основной нагрузки, во второй — от единичной горизонтальной силы в опоре В, в третьей — от единичных сил в дополнительном раскосе.

	U_1	U_2	U_3	V_1	V_2	V_3	V_4	O_1	O_2	O_3	D_1	D_2	D_3
1	6.496	2.336	0.000	-0.000	0.839	2.664	-3.504	0.000	-0.839	-2.611	-1.187	5.884	3.303
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.555	-0.000	0.000	-0.555	-0.832	0.000	0.000	-0.620	0.000	0.000	0.784
2	-0.066	7.662	0.000	5.934	-4.376	1.851	-5.554	-8.640	-5.854	-5.554	0.093	-2.533	7.854
	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	-0.707	0.000	0.000	-0.707	-0.471	-0.000	0.000	-0.745	0.000	0.000	0.850	0.000
3	2.598	2.250	-0.000	0.232	9.232	-7.732	9.000	0.348	8.531	6.364	-0.418	-8.112	-6.364
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	-0.000	-0.447	0.000	0.000	-0.447	-0.894	0.000	0.000	-0.632	-0.000	0.000	0.632
4	4.830	1.737	-29.901	1.546	10.546	-7.706	-5.950	3.092	34.730	8.707	-3.457	-33.350	33.430
	1.000	1.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.447	-0.000	-0.000	-0.894	-0.224	-0.000	-0.000	-0.806	0.000	0.000	0.500
5	0.000	-32.364	6.473	13.000	-12.946	0.054	-3.182	26.000	-12.837	-7.115	-29.069	40.938	-7.237
	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.707	0.000	-0.000	-0.707	-0.354	0.000	0.000	-0.791	0.000	0.000	0.791
6	0.000	-5.707	0.000	11.000	-2.750	18.609	5.797	8.696	8.250	-1.055	-11.667	-20.806	-9.511
	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.600	0.000	0.000	-0.800	-0.800	-0.000	-0.000	-0.600	0.000	0.000	1.000
7	0.000	1.396	-6.062	-5.083	2.542	-4.917	-11.417	-5.683	-5.083	-1.396	5.683	6.146	16.677
	-1.000	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	-0.600	0.000	0.000	-0.800	-0.800	-0.000	0.000	-0.600	0.000	0.000	1.000	0.000
8	8.796	8.796	0.000	7.464	10.000	-3.333	10.000	-7.746	6.009	5.000	-2.088	-16.580	-11.180
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.447	-0.000	0.000	-0.894	-0.894	0.000	0.000	-0.447	0.000	0.000	1.000
9	6.364	9.091	0.000	-1.363	3.637	6.136	-2.273	-2.727	4.313	-2.541	3.049	-7.187	2.541
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	-0.832	0.000	0.000	-0.555	-0.277	0.000	0.000	-0.877	0.000	0.877	-0.000	-0.000
10	10.969	23.962	23.962	0.000	13.331	9.000	0.000	0.000	-13.183	-0.000	-5.950	-13.697	-26.791
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.000	-0.000	-0.555	0.000	-0.000	-0.832	-0.277	0.000	0.000	-0.784	0.000	0.000	0.620
11	-14.000	4.155	4.155	0.000	-6.440	7.000	-0.000	0.000	5.594	0.000	15.652	-9.973	-4.645
	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.894	0.000	0.000	-0.447	-0.447	0.000	0.000	-0.894	0.000	0.000	1.000
12	0.000	13.034	13.085	-13.034	-0.034	12.966	2.828	-13.034	-13.085	4.472	18.433	0.061	-20.825
	-1.000	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.707	0.000	0.000	-0.707	-0.471	0.000	0.000	-0.745	0.000	-0.000	0.850
13	-2.182	-12.000	-12.000	-0.000	-1.818	-15.636	0.000	0.000	3.086	0.000	-3.580	13.885	14.422
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.000	-0.447	-0.000	-0.000	-0.447	-0.894	0.000	0.000	-0.632	0.000	0.000	0.632	0.000
14	14.087	14.087	16.252	-5.387	13.000	10.835	-0.000	5.204	-16.252	0.000	-22.135	3.062	-19.533
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.832	0.000	0.000	-0.555	-0.555	0.000	0.000	-0.832	0.000	0.000	1.000
15	-8.967	-12.831	-1.915	-2.967	-14.312	-1.277	0.000	4.320	1.915	0.000	12.681	13.119	2.302
	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.555	-0.000	-0.000	-0.555	-0.832	-0.000	-0.000	-0.620	0.000	0.000	0.784	0.000	0.000
16	-34.196	-34.196	3.480	-4.098	-27.059	0.441	0.000	3.674	-0.882	-0.000	38.232	39.715	-0.986
	0.000	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.555	0.000	0.000	-0.832	-0.277	0.000	0.000	-0.784	0.000	-0.000	0.620
17	-6.364	0.493	0.000	-1.714	10.286	-4.000	12.000	-6.857	12.649	12.000	7.068	-19.877	-25.971
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.970	0.000	0.000	-0.243	-0.243	-0.000	0.000	-0.970	0.000	0.000	1.000	0.000	0.000
18	0.000	21.335	6.761	-11.238	5.619	4.713	-14.573	-23.169	-22.477	-16.293	23.169	1.373	16.293
	-1.000	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.707	0.000	0.000	-0.354	-0.707	0.000	0.000	-0.791	0.000	0.000	0.791
19	15.576	15.576	-10.000	14.142	5.000	-5.000	0.000	-10.198	10.000	0.000	-11.090	-26.960	11.180
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.447	0.000	0.000	-0.224	-0.894	-0.000	0.000	-0.806	0.000	0.000	0.500	-0.000	0.000
20	5.796	28.216	28.216	-4.339	14.942	10.000	-0.000	-5.424	-14.333	0.000	4.473	-19.059	-31.546
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.447	-0.000	0.000	-0.894	-0.224	-0.000	-0.000	-0.806	0.000	-0.000	0.500
21	3.536	4.402	0.000	-0.577	6.423	-1.948	7.000	-0.866	6.161	5.845	1.041	-8.066	-4.164
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.832	0.000	0.000	-0.555	-0.555	-0.000	0.000	-0.832	0.000	0.000	1.000	-0.000	0.000
22	13.500	31.500	31.500	0.000	18.000	12.000	-0.000	0.000	-14.230	0.000	-12.092	-18.974	-33.204
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.707	0.000	0.000	-0.707	-0.707	0.000	0.000	-0.707	0.000	0.000	1.000	0.000	0.000
23	0.000	-6.846	0.000	1.277	-0.958	-8.277	7.000	1.151	0.638	6.846	-0.714	10.346	-6.669
	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.447	0.000	0.000	-0.894	-0.894	0.000	0.000	-0.447	0.000	0.000	1.000
24	4.684	4.684	-6.000	-5.732	9.000	-9.000	0.000	7.141	6.000	0.000	-5.854	-5.311	10.817
	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.707	-0.000	-0.000	-0.530	-0.707	0.000	0.000	-0.729	0.000	0.000	0.884	0.000	0.000
25	0.000	-5.223	-35.304	1.741	13.741	-13.500	0.232	5.223	32.706	-3.122	-5.506	-30.726	37.214
	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.949	0.000	0.000	-0.316	-0.316	-0.000	0.000	-0.949	-0.000	0.000	1.000	0.000	-0.000
26	-6.928	8.564	-0.000	-7.746	-1.746	6.037	-8.254	-15.492	-10.883	-9.055	17.320	-7.736	4.756
	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	-0.447	-0.000	0.000	-0.894	-0.894	0.000	0.000	-0.447	0.000	0.000	1.000
27	-7.794	-30.000	-30.000	-4.477	-4.833	-20.023	0.000	-5.380	4.692	0.000	4.719	29.832	31.623
	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	-0.707	0.000	0.000	-0.707	-0.236	0.000	0.000	-0.850	0.000	0.000	0.745	0.000	0.000
28	0.000	-10.500	5.216	7.000	-10.477	-3.477	1.345	10.500	-5.216	-6.480	-12.619	18.888	0.820
	0.000	-1.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	-0.832	0.000	0.000	-0.555	-0.555	0.000	0.000	-0.832	0.000	0.000	1.000	0.000
29	0.000	-14.000	-8.112	7.000	-1.963	5.037	-2.562	14.000	8.112	8.573	-15.652	6.207	2.292
	0.000	-1.000	-1.000	0.000	0.000	0.000	0.000						