

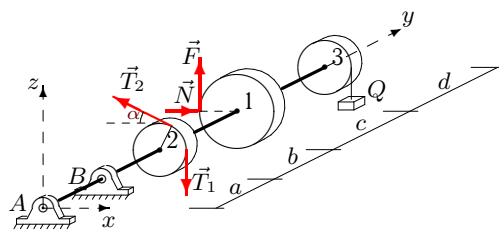
Равновесие вала

Горизонтальный вал весом G может вращаться в цилиндрических шарнирах A и B . К шкиву 1 приложено нормальное давление N и касательная сила сопротивления F , пропорциональная N . На шкив 2 действуют силы натяжения ремней T_1 и T_2 . Груз Q висит на нити, навитой на шкив 3. Определить силу давления N и реакции шарниров в условии равновесия вала (в Н). Учесть веса шкивов P_1, P_2, P_3 . Все нагрузки действуют в вертикальной плоскости. Силы даны в Н, размеры — в см.

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Вариант 1

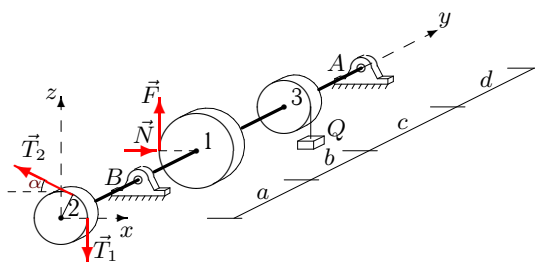
C19.



$$F = 0.2N, T_1 = 30, \\ T_2 = 58, P_1 = 18, \\ P_2 = 10, P_3 = 14, \\ Q = 14, G = 15, \\ \alpha = 30^\circ, R_1 = 18, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 24, \\ c = 25, d = 24.$$

Вариант 2

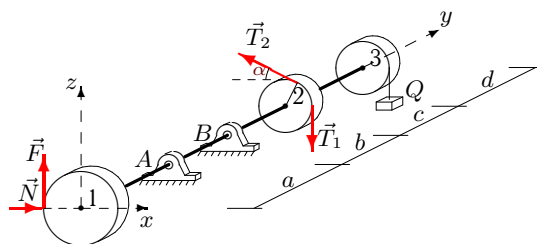
C19.



$$F = 0.3N, T_1 = 50, \\ T_2 = 96, P_1 = 32, \\ P_2 = 20, P_3 = 28, \\ Q = 22, G = 25, \\ \alpha = 45^\circ, R_1 = 20, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 28, \\ c = 30, d = 26.$$

Вариант 3

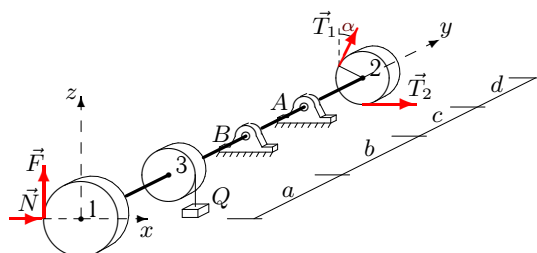
C19.



$$F = 0.2N, T_1 = 60, \\ T_2 = 116, P_1 = 26, \\ P_2 = 20, P_3 = 24, \\ Q = 22, G = 30, \\ \alpha = 45^\circ, R_1 = 16, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 26, \\ c = 28, d = 23.$$

Вариант 4

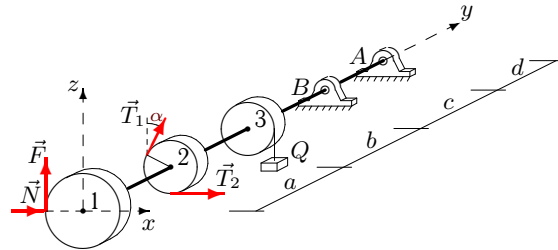
C19.



$$F = 0.1N, T_1 = 60, \\ T_2 = 116, P_1 = 32, \\ P_2 = 20, P_3 = 24, \\ Q = 22, G = 30, \\ \alpha = 45^\circ, R_1 = 28, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 26, \\ c = 28, d = 26.$$

Вариант 5

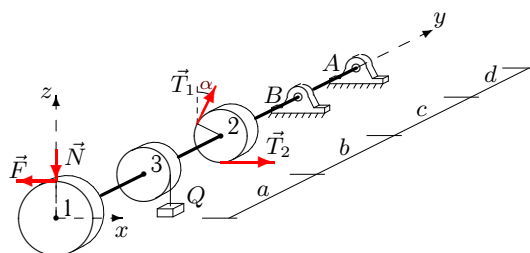
C19.



$$F = 0.4N, T_1 = 60, \\ T_2 = 117, P_1 = 44, \\ P_2 = 30, P_3 = 38, \\ Q = 18, G = 30, \\ \alpha = 60^\circ, R_1 = 26, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 27, \\ c = 30, d = 27.$$

Вариант 6

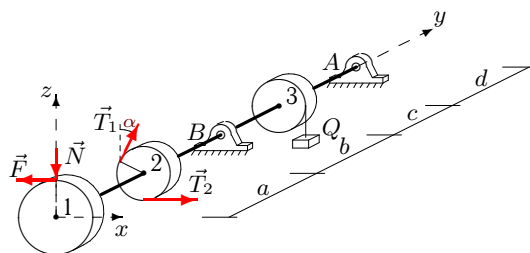
C19.



$$F = 0.4N, T_1 = 60, \\ T_2 = 34, P_1 = 46, \\ P_2 = 30, P_3 = 38, \\ Q = 26, G = 30, \\ \alpha = 60^\circ, R_1 = 30, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 29, \\ c = 32, d = 28.$$

Вариант 7

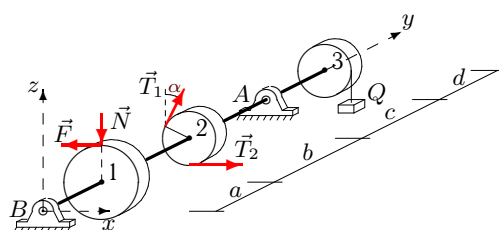
C19.



$$F = 0.4N, T_1 = 60, \\ T_2 = 34, P_1 = 34, \\ P_2 = 20, P_3 = 28, \\ Q = 26, G = 30, \\ \alpha = 45^\circ, R_1 = 24, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 29, \\ c = 31, d = 27.$$

Вариант 8

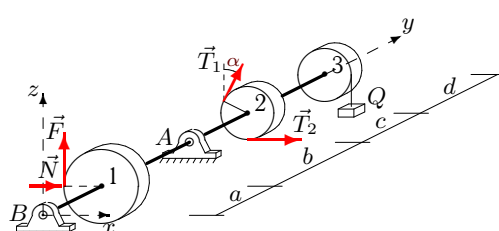
C19.



$$F = 0.2N, T_1 = 40, \\ T_2 = 22, P_1 = 32, \\ P_2 = 20, P_3 = 24, \\ Q = 26, G = 20, \\ \alpha = 45^\circ, R_1 = 28, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 27, \\ c = 29, d = 26.$$

Вариант 9

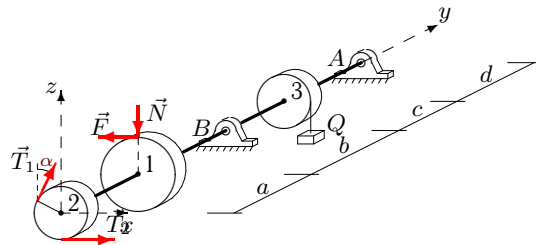
C19.



$$F = 0.4N, T_1 = 40, \\ T_2 = 78, P_1 = 26, \\ P_2 = 10, P_3 = 18, \\ Q = 14, G = 20, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 26, \\ c = 27, d = 28.$$

Вариант 10

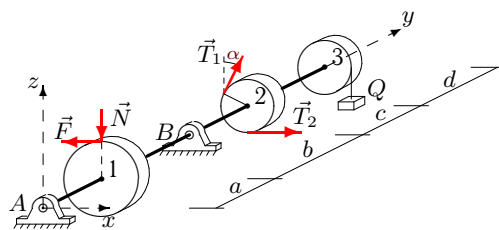
C19.



$$F = 0.3N, T_1 = 50, \\ T_2 = 28, P_1 = 34, \\ P_2 = 20, P_3 = 28, \\ Q = 26, G = 25, \\ \alpha = 45^\circ, R_1 = 24, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 29, \\ c = 31, d = 27.$$

Вариант 11

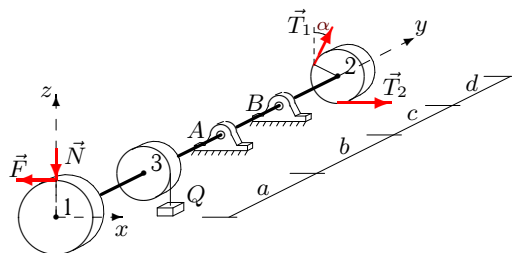
C19.



$$F = 0.1N, T_1 = 30, \\ T_2 = 16, P_1 = 32, \\ P_2 = 20, P_3 = 24, \\ Q = 10, G = 15, \\ \alpha = 45^\circ, R_1 = 28, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 23, \\ c = 25, d = 26.$$

Вариант 12

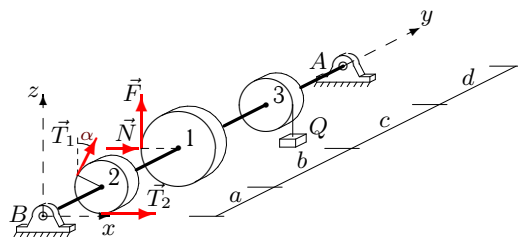
C19.



$$F = 0.1N, T_1 = 60, \\ T_2 = 31, P_1 = 22, \\ P_2 = 10, P_3 = 14, \\ Q = 26, G = 30, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 27, \\ c = 28, d = 26.$$

Вариант 13

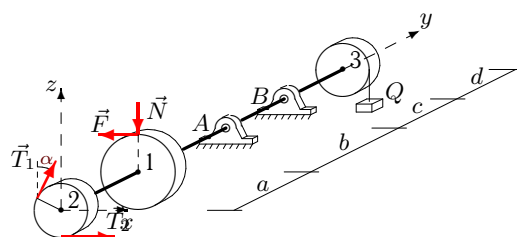
C19.



$$F = 0.3N, T_1 = 40, \\ T_2 = 78, P_1 = 34, \\ P_2 = 20, P_3 = 28, \\ Q = 14, G = 20, \\ \alpha = 45^\circ, R_1 = 24, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 26, \\ c = 28, d = 27.$$

Вариант 14

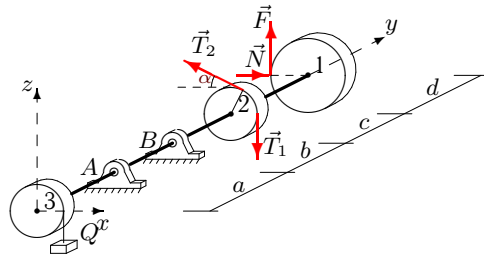
C19.



$$F = 0.4N, T_1 = 50, \\ T_2 = 29, P_1 = 24, \\ P_2 = 10, P_3 = 18, \\ Q = 26, G = 25, \\ \alpha = 30^\circ, R_1 = 22, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 29, \\ c = 30, d = 27.$$

Вариант 15

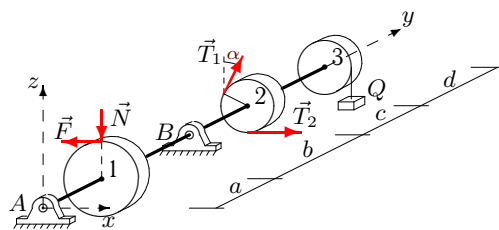
C19.



$$F = 0.4N, T_1 = 70, \\ T_2 = 137, P_1 = 20, \\ P_2 = 10, P_3 = 18, \\ Q = 18, G = 35, \\ \alpha = 30^\circ, R_1 = 14, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 27, \\ c = 28, d = 25.$$

Вариант 16

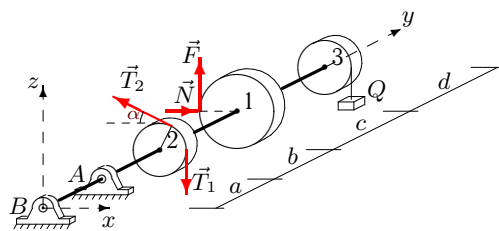
C19.



$$F = 0.2N, T_1 = 30, \\ T_2 = 17, P_1 = 22, \\ P_2 = 10, P_3 = 14, \\ Q = 26, G = 15, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 27, \\ c = 28, d = 26.$$

Вариант 17

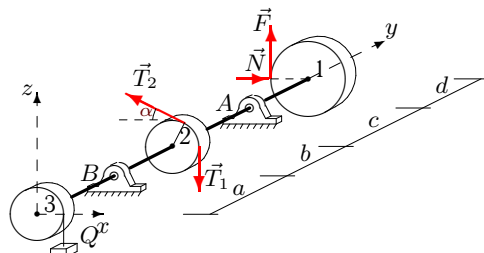
C19.



$$F = 0.3N, T_1 = 40, \\ T_2 = 78, P_1 = 20, \\ P_2 = 10, P_3 = 18, \\ Q = 14, G = 20, \\ \alpha = 30^\circ, R_1 = 14, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 26, \\ c = 27, d = 25.$$

Вариант 18

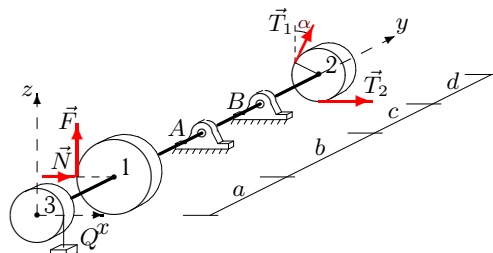
C19.



$$F = 0.2N, T_1 = 70, \\ T_2 = 137, P_1 = 28, \\ P_2 = 20, P_3 = 24, \\ Q = 18, G = 35, \\ \alpha = 45^\circ, R_1 = 20, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 25, \\ c = 27, d = 24.$$

Вариант 19

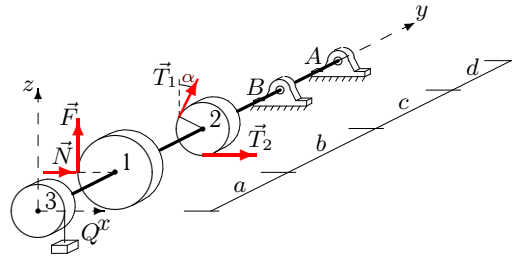
C19.



$$F = 0.3N, T_1 = 70, \\ T_2 = 138, P_1 = 26, \\ P_2 = 10, P_3 = 18, \\ Q = 14, G = 35, \\ \alpha = 30^\circ, R_1 = 26, \\ R_2 = 8, R_3 = 10, \\ a = 24, b = 26, \\ c = 27, d = 28.$$

Вариант 20

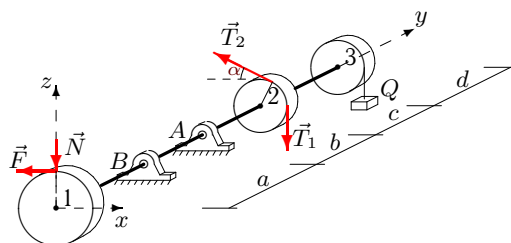
C19.



$$F = 0.4N, T_1 = 70, \\ T_2 = 136, P_1 = 46, \\ P_2 = 30, P_3 = 38, \\ Q = 22, G = 35, \\ \alpha = 60^\circ, R_1 = 30, \\ R_2 = 12, R_3 = 14, \\ a = 24, b = 28, \\ c = 31, d = 28.$$

Вариант 21

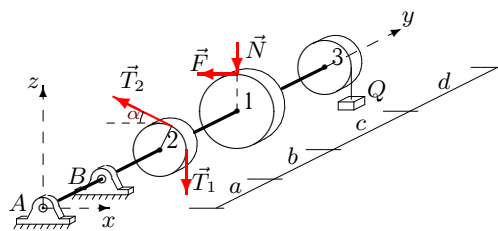
C19.



$$F = 0.2N, T_1 = 60, \\ T_2 = 32, P_1 = 18, \\ P_2 = 10, P_3 = 14, \\ Q = 26, G = 30, \\ \alpha = 30^\circ, R_1 = 18, \\ R_2 = 8, R_3 = 9, \\ a = 22, b = 27, \\ c = 28, d = 24.$$

Вариант 22

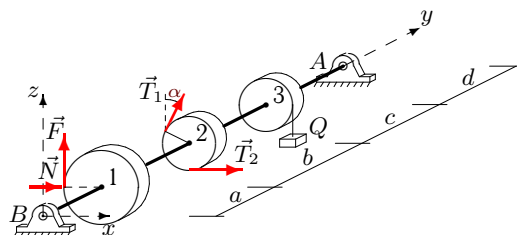
C19.



$$F = 0.3N, T_1 = 30, \\ T_2 = 18, P_1 = 32, \\ P_2 = 20, P_3 = 28, \\ Q = 26, G = 15, \\ \alpha = 45^\circ, R_1 = 20, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 29, \\ c = 31, d = 26.$$

Вариант 23

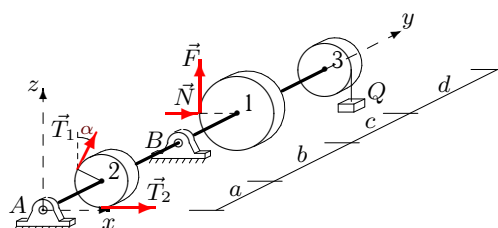
C19.



$$F = 0.4N, T_1 = 40, \\ T_2 = 76, P_1 = 36, \\ P_2 = 20, P_3 = 28, \\ Q = 22, G = 20, \\ \alpha = 45^\circ, R_1 = 28, \\ R_2 = 10, R_3 = 12, \\ a = 24, b = 28, \\ c = 30, d = 28.$$

Вариант 24

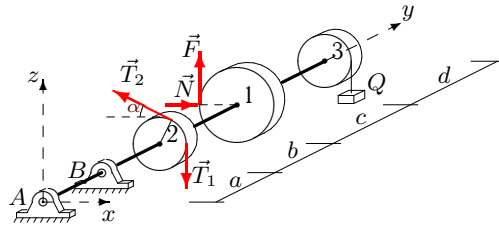
C19.



$$F = 0.1N, T_1 = 30, \\ T_2 = 57, P_1 = 30, \\ P_2 = 20, P_3 = 24, \\ Q = 18, G = 15, \\ \alpha = 45^\circ, R_1 = 24, \\ R_2 = 10, R_3 = 11, \\ a = 22, b = 25, \\ c = 27, d = 25.$$

Вариант 25

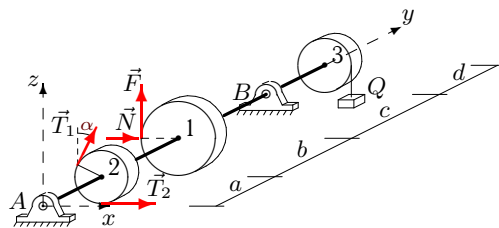
C19.



$F = 0.4N, T_1 = 30,$
 $T_2 = 57, P_1 = 30,$
 $P_2 = 20, P_3 = 28,$
 $Q = 22, G = 15,$
 $\alpha = 45^\circ, R_1 = 16,$
 $R_2 = 10, R_3 = 12,$
 $a = 24, b = 28,$
 $c = 30, d = 25.$

Вариант 26

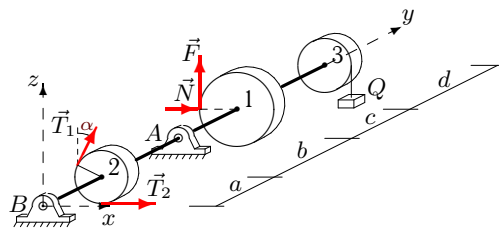
C19.



$F = 0.2N, T_1 = 30,$
 $T_2 = 57, P_1 = 40,$
 $P_2 = 30, P_3 = 34,$
 $Q = 18, G = 15,$
 $\alpha = 60^\circ, R_1 = 26,$
 $R_2 = 12, R_3 = 13,$
 $a = 22, b = 25,$
 $c = 28, d = 25.$

Вариант 27

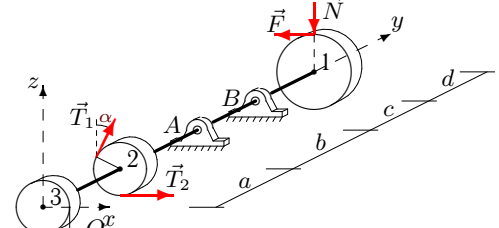
C19.



$F = 0.4N, T_1 = 40,$
 $T_2 = 78, P_1 = 24,$
 $P_2 = 10, P_3 = 18,$
 $Q = 14, G = 20,$
 $\alpha = 30^\circ, R_1 = 22,$
 $R_2 = 8, R_3 = 10,$
 $a = 24, b = 26,$
 $c = 27, d = 27.$

Вариант 28

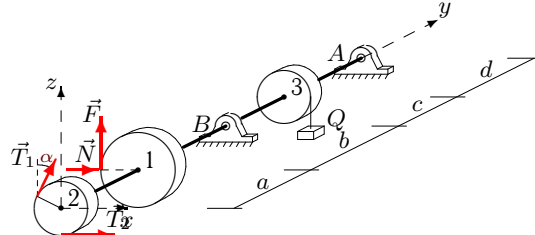
C19.



$F = 0.3N, T_1 = 70,$
 $T_2 = 38, P_1 = 24,$
 $P_2 = 10, P_3 = 18,$
 $Q = 26, G = 35,$
 $\alpha = 30^\circ, R_1 = 22,$
 $R_2 = 8, R_3 = 10,$
 $a = 24, b = 29,$
 $c = 30, d = 27.$

Вариант 29

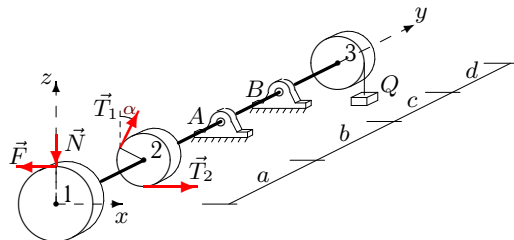
C19.



$F = 0.3N, T_1 = 50,$
 $T_2 = 98, P_1 = 36,$
 $P_2 = 20, P_3 = 28,$
 $Q = 14, G = 25,$
 $\alpha = 45^\circ, R_1 = 28,$
 $R_2 = 10, R_3 = 12,$
 $a = 24, b = 26,$
 $c = 28, d = 28.$

Вариант 30

С19.



$F = 0.1N$, $T_1 = 60$,
 $T_2 = 31$, $P_1 = 20$,
 $P_2 = 10$, $P_3 = 14$,
 $Q = 26$, $G = 30$,
 $\alpha = 30^\circ$, $R_1 = 22$,
 $R_2 = 8$, $R_3 = 9$,
 $a = 22$, $b = 27$,
 $c = 28$, $d = 25$.

Отвѣты

	N	X_A	Z_A	X_B	Z_B
1	27.222	5.836	-150.260	17.172	216.816
2	32.667	-30.284	50.247	65.499	49.070
3	99.375	-271.795	-78.474	254.445	158.574
4	113.571	-110.843	-118.139	-161.155	192.355
5	41.538	481.312	-174.376	-691.812	287.761
6	56.333	29.837	-480.619	-93.265	676.952
7	59.583	16.434	-44.147	-69.028	199.304
8	83.214	-26.895	107.292	-6.747	69.638
9	15.769	-158.489	59.705	44.720	-12.654
10	73.889	46.810	-9.973	-87.999	181.507
11	89.286	25.237	23.131	-53.522	145.941
12	179.231	105.931	698.242	-149.008	-468.973
13	29.444	-38.315	51.291	-97.414	27.592
14	48.636	-111.139	34.451	76.594	73.884
15	63.571	1.749	65.434	53.325	11.638
16	65.000	25.449	12.224	-44.449	113.796
17	39.048	15.451	228.000	13.051	-156.714
18	118.000	-125.888	3.530	104.761	70.996
19	51.795	77.736	196.051	-302.531	-169.211
20	40.333	302.676	-269.630	-539.632	389.496
21	127.222	35.720	140.374	17.438	128.848
22	72.000	-69.380	-517.912	103.707	728.184
23	8.571	-51.168	50.463	-61.688	43.824
24	30.000	-24.369	-63.422	-83.844	146.209
25	0.938	-43.932	-275.084	82.592	380.111
26	17.308	-65.101	11.908	-35.187	106.631
27	18.636	-75.740	101.012	-40.896	-57.108
28	78.182	-164.676	-37.120	115.130	167.680
29	37.143	136.312	24.509	-306.810	51.993
30	211.818	-61.571	547.218	21.753	-287.362