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TOTALLY POSITIVE ALGEBRAIC INTEGERS OF SMALL TRACE

by Christopher SMYTH

Let $r \geqslant 0$ be a given integer. We describe an algorithm for finding all totally positive algebraic integers α which satisfy

$$\operatorname{Tr} \alpha - \deg \alpha = r \tag{1}$$

(where $\operatorname{Tr} \alpha$ = trace of α, $\deg \alpha$ = degree of α). That r must be non-negative is an immediate consequence of the inequality of the arithmetic and geometric means. The algorithm is based on a recent improvement [5] of a result of Siegel [3], combined with a method of Robinson [1] for enumerating totally real polynomials of a specific type. The algorithm was implemented on the University College, Cardiff, Honeywell computer which took 40 minutes CPU time to find all relevant α with $r = 0, 1, 2, \ldots, 6$. (Almost all of this time was spent on the last case: $r = 6$, $\deg \alpha = 7$). The table of these α appears as an appendix to this paper.

This work was stimulated by a question of Serre, who asked for a list of these algebraic integers, for an application connected with bounding the number of points on algebraic curves over finite fields.

1. Bounding the degree.

Assume from now on that α is a totally positive algebraic integer of degree d. Siegel showed that then $\operatorname{Tr} \alpha > \frac{3}{2} d$ unless $\alpha = 1$ or $(3 \pm \sqrt{5})/2$. His method was to use known lower

bounds for the discriminant $\prod_{i \neq j} (\alpha_i - \alpha_j)$ (the α_i being the conjugates of α) to improve upon the inequality of the arithmetic and geometric means. From Siegel's result we see on using (1) that $d < 2r \ (\alpha \neq 1, (3 \pm \sqrt{5})/2)$. This bounds d for fixed r. However, the bound is not a sharp one, as e.g. for $r = 6$ we get $d \leqslant 11$ while in fact, as we shall see below, $d \leqslant 7$.

My recent improvement of Siegel's result is contained in the following theorem, and produces a corresponding improvement in the bounds for the degree, which are sharp at least for $r \leqslant 6$.

THEOREM. – *If* α *is a totally positive algebraic integer satisfying (1), then*

$$\operatorname{Tr} \alpha > 1.7719\, d \tag{2}$$

and

$$d \leqslant [1.2955\, r] =: \mathrm{B}(r) \tag{3}$$

unless α *has minimal polynomial*

$$x - 1, x^2 - 3x + 1, x^3 - 5x^2 + 6x - 1, x^4 - 7x^3 + 13x^2 - 7x + 1$$

or $x^4 - 7x^3 + 14x^2 - 8x + 1$.

The results of [5] are in fact stated for totally real rather than totally positive algebraic integers, but are easily modified. The result we need here is that since $\alpha = (\sqrt{\alpha})^2$ and $\sqrt{\alpha}$ is totally real, from [5, Table 1, $p = 2$] we have,

$$\operatorname{Tr} \alpha > (1.33114)^2\, d > 1.7719\, d,$$

with the five exceptions above. Then (3) follows immediately.

r	1	2	3	4	5	6	7 ...
B(r)	1	2	3	5	6	7	9 ...

The method used in [5] to bound the trace differs from Siegel's method in that *resultant* information is used instead of discriminant information, to improve the lower bound for $\operatorname{Tr} \alpha$. Here is an outline of the method:

We make a list of totally positive algebraic integers α', with minimal polynomials $\mathrm{P}_1, \mathrm{P}_2, \ldots, \mathrm{P}_n$ say, which have

(trace α')/deg α' small. Then for any totally positive α not on the list, the resultant of α and α' is non-zero, and so at least 1 in absolute value. Hence, writing

$$\mu_\alpha(x) = d^{-1} \times (\text{number of conjugates of } \alpha \text{ in } (0,x))$$

we have

$$\int_0^\infty \log|P_j(x)|\, d\mu_\alpha(x) \geqslant 0 \quad (j = 1, \ldots, n).$$

Also $d^{-1} \operatorname{Tr} \alpha = \int_0^\infty x\, d\mu_\alpha(x)$.

Hence if we can solve $\min_\mu \int_0^\infty x\, d\mu_\alpha(x)$ subject to

$$\int_0^\infty \log|P_j(x)|\, d\mu_\alpha(x) \geqslant 0 \quad (j = 1, \ldots, n)$$

the minimum being taken over *all* probability distributions μ on $(0,\infty)$, we will have obtained a lower bound for $d^{-1} \operatorname{Tr} \alpha$. This latter problem is conveniently attacked by first forming the dual problem, which is

$$\underset{c_1, c_2, \ldots, c_n \geqslant 0}{\text{Maximize}} \ \min_{x > 0} \left(x - \sum_{j=1}^{n} c_j \log|P_j(x)| \right).$$

This can be efficiently solved by an iterative method (essentially as described in [4]) similar to the Remes Algorithm of approximation theory (see [1]).

2. Enumeration of the polynomials.

To apply the enumeration algorithm, we fix not only r but also $d \leqslant B(r)$. Since the problem is trivial for $r = 0$ or 1, we assume $r \geqslant 2$. Robinson's method, which he used to search for polynomials of span less than 4, is to use the fact that if a polynomial has all real roots, so do all its derivatives. His basic result can be stated as a

LEMMA. – *Let* $k \geqslant 2$, *and* $p(x)$ *be a monic polynomial of degree* $k-1$, *with real zeros* $\beta_1 > \beta_2 > \beta_3 \ldots > \beta_{k-1} > 0$. *Let* $P(x) = k \int_0^x p(t)\, dt$, *monic of degree* k. *Then* $P(x) - c$ *has all zeros real and positive iff* $(-1)^k c < 0$ *and*

$$\max_{i=1}^{[k/2]} P(\beta_{2i-1}) \leqslant c \leqslant \min_{i=1}^{[(k-1)/2]} P(\beta_{2i}).$$

Proof. – Obvious from the graph of $P(x)$.

This lemma is applied to generate a finite tree search, to enumerate the required polynomials, in the following way. Put

$$P_\alpha(x) := x^d - (r+d)x^{d-1} + a_2 x^{d-2} - \ldots + (-1)^d a_d,$$

the minimal polynomial of α. Then for $k = d, d-1, \ldots, 1$ write

$$P_{\alpha,k}(x) := \frac{k!\, d^{d-k}}{d!\, dx^{d-k}} P_\alpha(x)$$

$$= x^k - (r+d)\frac{k}{d}x^{k-1} + \ldots + (-1)^k a_k / \binom{d}{k}. \quad (4)$$

In particular $P_{\alpha,2}(x) = x^2 - (r+d)\frac{2}{d}x + a_2/\binom{d}{2}$. If $P_\alpha = P_{\alpha,d}$ has all zeros real, so have $P_{\alpha,d-1}, P_{\alpha,d-2}, \ldots, P_{\alpha,2}$. Hence the lemma can be applied successively to $P_{\alpha,1}, P_{\alpha,2}, \ldots, P_{\alpha,d-1}$ to find ranges for $a_2, a_3, \ldots, a_d$ which ensure in turn that $P_{\alpha,2}, \ldots, P_{\alpha,d}$ have all zeros real and positive. This produces a tree whose root is $a_1 = r + d$ (the first generation), and whose k *th* generation consists of nodes a_k which have the property that the path $a_1, a_2, a_3, \ldots, a_k$ from the root to a_k corresponds to a polynomial $P_{\alpha,k}$ as in (4) with all zeros real and positive.

When the lemma is applied with $p = P_{\alpha,k-1}$ and $-c = (-1)^k a_k / \binom{d}{k}$, there may be no integers a_k in the allowable range, in which case a_{k-1} is a terminal node. Otherwise there will be a finite number of choices for a_k.

All paths $a_1, a_2, a_3, \ldots, a_d$ in the completed tree correspond to monic integral polynomials P_α with all zeros real and positive. Some of these polynomials may of course be reducible, and must be eliminated from the list. To do this, note that if P_α is reducible, it must be factorable as

$$(x^{d'} - (r'+d')x^{d'-1} + \ldots)(x^{d-d'} + ((r-r') + (d-d'))x^{d-d'-1} + \ldots)$$

where $1 \leqslant d' \leqslant [1/2\, d], 0 \leqslant r' \leqslant r$. Hence if we compute the P_α successively for $(r,d) = (0,1), (1,1), (1,2), (2,1), (2,2), \ldots,$ then any reducible polynomial must have as a factor one of the earlier irreducible polynomials found. In this way reducible polynomials are readily eliminated from the list.

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List of all totally positive algebraic integers with (trace - degree) at most 6

tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
0	1	1.0000	1	1	-1			
1	1	2.0000	1	1	-2			
1	2	2.6180	5	1	-3	1		
2	1	3.0000	1	1	-3			
2	2	3.7321	12	1	-4	1		
2	2	3.4142	8	1	-4	2		
2	3	3.2470	49	1	-5	6	-1	
3	1	4.0000	1	1	-4			
3	2	4.7913	21	1	-5	1		
3	2	4.5616	17	1	-5	2		
3	2	4.3028	13	1	-5	3		
3	2	3.6180	5	1	-5	5		
3	3	5.0489	49	1	-6	5	-1	
3	3	4.4909	257	1	-6	7	-1	
3	3	4.1149	229	1	-6	8	-1	
3	3	4.2143	148	1	-6	8	-2	
3	3	3.5321	81	1	-6	9	-1	
3	3	3.8794	81	1	-6	9	-3	
3	4	4.3903	725	1	-7	13	-7	1
3	4	3.9563	1125	1	-7	14	-8	1
4	1	5.0000	1	1	-5			
4	2	5.8284	32	1	-6	1		
4	2	5.6458	28	1	-6	2		
4	2	5.4495	24	1	-6	3		
4	2	5.2361	20	1	-6	4		
4	2	4.7321	12	1	-6	6		
4	2	4.4142	8	1	-6	7		
4	3	6.0329	257	1	-7	6	-1	
4	3	5.6044	697	1	-7	8	-1	
4	3	5.3539	788	1	-7	9	-1	
4	3	5.4027	469	1	-7	9	-2	
4	3	5.0644	761	1	-7	10	-1	
4	3	5.1249	568	1	-7	10	-2	
4	3	5.1819	321	1	-7	10	-3	
4	3	4.7093	592	1	-7	11	-1	
4	3	4.8662	404	1	-7	11	-3	
4	3	4.9354	229	1	-7	11	-4	
4	3	4.1987	257	1	-7	12	-1	
4	3	4.3429	316	1	-7	12	-2	
4	3	4.4605	321	1	-7	12	-3	
4	3	4.6511	169	1	-7	12	-5	

tr-deg	deg	max.zero	poly. disc.	poly. coefficients					
4	3	4.1701	148	1	-7	13	-5		
4	3	3.8019	49	1	-7	14	-7		
4	4	5.7834	1125	1	-8	14	-7	1	
4	4	5.5519	4752	1	-8	15	-8	1	
4	4	5.2227	4352	1	-8	16	-8	1	
4	4	5.2905	8069	1	-8	16	-9	1	
4	4	4.8931	7537	1	-8	17	-9	1	
4	4	4.9831	10512	1	-8	17	-10	1	
4	4	4.2498	1957	1	-8	18	-9	1	
4	4	4.4458	6224	1	-8	18	-10	1	
4	4	4.5906	9909	1	-8	18	-11	1	
4	4	4.6855	4352	1	-8	18	-12	2	
4	4	4.8116	725	1	-8	18	-13	1	
4	4	3.9021	2000	1	-8	19	-12	1	
4	4	4.1439	2777	1	-8	19	-13	2	
4	4	4.3799	5744	1	-8	19	-14	1	
4	4	3.9319	2304	1	-8	20	-16	1	
4	4	3.8478	2048	1	-8	20	-16	2	
4	4	4.0615	1957	1	-8	20	-17	3	
4	5	4.6254	38569	1	-9	26	-29	11	-1
4	5	4.0264	36497	1	-9	27	-31	12	-1
4	5	4.2608	38569	1	-9	27	-32	13	-1
4	5	3.6825	14641	1	-9	28	-35	15	-1
5	1	6.0000	1	1	-6				
5	2	6.8541	45	1	-7	1			
5	2	6.7016	41	1	-7	2			
5	2	6.5414	37	1	-7	3			
5	2	6.3723	33	1	-7	4			
5	2	6.1926	29	1	-7	5			
5	2	5.7913	21	1	-7	7			
5	2	5.5616	17	1	-7	8			
5	2	5.3028	13	1	-7	9			
5	2	4.6180	5	1	-7	11			
5	3	7.1842	229	1	-8	6	-1		
5	3	7.0236	697	1	-8	7	-1		
5	3	6.8794	148	1	-8	8	-2		
5	3	6.6739	1489	1	-8	9	-1		
5	3	6.4808	1765	1	-8	10	-1		
5	3	6.5114	1076	1	-8	10	-2		
5	3	6.2714	1929	1	-8	11	-1		
5	3	6.3059	1384	1	-8	11	-2		
5	3	6.3395	785	1	-8	11	-3		
5	3	6.0410	1957	1	-8	12	-1		
5	3	6.0806	1556	1	-8	12	-2		
5	3	6.1190	1101	1	-8	12	-3		
5	3	6.1563	592	1	-8	12	-4		
5	3	5.7813	1825	1	-8	13	-1		
5	3	5.8737	1257	1	-8	13	-3		
5	3	5.9173	892	1	-8	13	-4		
5	3	5.9593	473	1	-8	13	-5		
5	3	5.4774	1509	1	-8	14	-1		
5	3	5.5366	1396	1	-8	14	-2		
5	3	5.5926	1229	1	-8	14	-3		
5	3	5.6964	733	1	-8	14	-5		
5	3	5.7448	404	1	-8	14	-6		

tr-des	des	max.zero	poly. disc.	poly. coefficients				
5	3	5.0938	985	1	-8	15	-1	
5	3	5.1774	1016	1	-8	15	-2	
5	3	5.2534	993	1	-8	15	-3	
5	3	5.3234	916	1	-8	15	-4	
5	3	5.3885	785	1	-8	15	-5	
5	3	5.5070	361	1	-8	15	-7	
5	3	4.4728	229	1	-8	16	-1	
5	3	4.6554	404	1	-8	16	-2	
5	3	4.9032	592	1	-8	16	-4	
5	3	5.0861	564	1	-8	16	-6	
5	3	5.1642	469	1	-8	16	-7	
5	3	4.3772	169	1	-8	17	-5	
5	3	4.6996	321	1	-8	17	-7	
5	3	4.8136	316	1	-8	17	-8	
5	3	4.9122	257	1	-8	17	-9	
5	3	4.4812	148	1	-8	18	-10	
5	3	4.2470	49	1	-8	19	-13	
5	4	6.8240	8069	1	-9	16	-8	1
5	4	6.6067	7537	1	-9	17	-8	1
5	4	6.6407	16317	1	-9	17	-9	1
5	4	6.3660	1957	1	-9	18	-8	1
5	4	6.4054	21964	1	-9	18	-9	1
5	4	6.4437	25717	1	-9	18	-10	1
5	4	6.4751	2777	1	-9	18	-11	2
5	4	6.1399	19773	1	-9	19	-9	1
5	4	6.1854	35537	1	-9	19	-10	1
5	4	6.2292	36677	1	-9	19	-11	1
5	4	6.2648	11324	1	-9	19	-12	2
5	4	5.8857	33709	1	-9	20	-10	1
5	4	5.9400	47032	1	-9	20	-11	1
5	4	5.9916	48069	1	-9	20	-12	1
5	4	5.9832	8468	1	-9	20	-12	2
5	4	6.0729	1957	1	-9	20	-14	3
5	4	5.4340	5125	1	-9	21	-9	1
5	4	5.5151	23377	1	-9	21	-10	1
5	4	5.5891	40765	1	-9	21	-11	1
5	4	5.6575	53401	1	-9	21	-12	1
5	4	5.7213	56749	1	-9	21	-13	1
5	4	5.7105	19796	1	-9	21	-13	2
5	4	5.7711	30056	1	-9	21	-14	2
5	4	5.8379	14197	1	-9	21	-15	1
5	4	5.8188	9909	1	-9	21	-15	3
5	4	4.9705	8069	1	-9	22	-10	1
5	4	5.1052	20900	1	-9	22	-11	1
5	4	5.2166	35829	1	-9	22	-12	1
5	4	5.3132	49292	1	-9	22	-13	1
5	4	5.2959	10273	1	-9	22	-13	2
5	4	5.3992	57077	1	-9	22	-14	1
5	4	5.3839	25492	1	-9	22	-14	2
5	4	5.4636	35537	1	-9	22	-15	2
5	4	5.5492	35525	1	-9	22	-16	1
5	4	5.5238	17069	1	-9	22	-16	3
5	4	5.5806	2777	1	-9	22	-17	4
5	4	5.6568	3981	1	-9	22	-18	3
5	4	4.6231	11197	1	-9	23	-13	1
5	4	4.8274	26569	1	-9	23	-14	1
5	4	4.9744	40437	1	-9	23	-15	1
5	4	4.9474	19796	1	-9	23	-15	2
5	4	5.0718	30972	1	-9	23	-16	2

tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
5	4	5.1961	44869	1	-9	23	-17	1
5	4	5.1581	19429	1	-9	23	-17	3
5	4	5.2867	24417	1	-9	23	-18	1
5	4	5.2703	30776	1	-9	23	-18	2
5	4	5.3388	17989	1	-9	23	-19	3
5	4	4.4005	6809	1	-9	24	-17	2
5	4	4.6954	28669	1	-9	24	-18	1
5	4	4.6113	9909	1	-9	24	-18	3
5	4	4.8517	31288	1	-9	24	-19	1
5	4	4.8224	27329	1	-9	24	-19	2
5	4	4.7580	7537	1	-9	24	-19	4
5	4	4.9773	16357	1	-9	24	-20	1
5	4	4.9537	23252	1	-9	24	-20	2
5	4	4.9291	22221	1	-9	24	-20	3
5	4	4.8760	2525	1	-9	24	-20	5
5	4	5.0437	13068	1	-9	24	-21	3
5	4	5.0223	15529	1	-9	24	-21	4
5	4	5.1058	8789	1	-9	24	-22	5
5	4	4.3528	12357	1	-9	25	-21	1
5	4	4.2784	8468	1	-9	25	-21	2
5	4	4.1796	3981	1	-9	25	-21	3
5	4	4.5795	10889	1	-9	25	-22	1
5	4	4.5374	13768	1	-9	25	-22	2
5	4	4.4383	8900	1	-9	25	-22	4
5	4	4.6764	8957	1	-9	25	-23	3
5	4	4.6412	11348	1	-9	25	-23	4
5	4	4.6031	9301	1	-9	25	-23	5
5	4	4.7625	6809	1	-9	25	-24	5
5	4	4.8405	4205	1	-9	25	-25	7
5	4	3.8271	1125	1	-9	26	-24	1
5	4	4.2840	3981	1	-9	26	-26	5
5	4	4.1268	1957	1	-9	26	-26	7
5	4	4.3623	2777	1	-9	26	-27	8
5	4	4.5231	1957	1	-9	26	-28	9
5	4	4.0953	725	1	-9	27	-31	11
5	5	6.1940	38569	1	-10	28	-29	10 -1
5	5	5.7544	38569	1	-10	29	-28	10 -1
5	5	5.8970	89417	1	-10	29	-30	10 -1
5	5	5.9506	233489	1	-10	29	-31	11 -1
5	5	6.0017	24217	1	-10	29	-32	12 -1
5	5	5.3213	89417	1	-10	30	-29	10 -1
5	5	5.6853	117688	1	-10	30	-33	11 -1
5	5	5.6715	530193	1	-10	30	-33	12 -1
5	5	5.7343	347317	1	-10	30	-34	13 -1
5	5	4.7281	24217	1	-10	31	-31	11 -1
5	5	5.1339	307145	1	-10	31	-33	11 -1
5	5	5.2635	224773	1	-10	31	-34	11 -1
5	5	5.2406	625433	1	-10	31	-34	12 -1
5	5	5.3732	36497	1	-10	31	-35	11 -1
5	5	5.3339	763945	1	-10	31	-35	13 -1
5	5	5.4353	301117	1	-10	31	-36	13 -1
5	5	5.4176	687329	1	-10	31	-36	14 -1
5	5	5.4938	357977	1	-10	31	-37	15 -1
5	5	5.4804	176684	1	-10	31	-37	16 -2
5	5	4.3554	38569	1	-10	32	-35	12 -1
5	5	4.7430	301909	1	-10	32	-36	12 -1
5	5	4.6880	339509	1	-10	32	-36	13 -1
5	5	4.9424	294577	1	-10	32	-37	12 -1
5	5	4.9071	617176	1	-10	32	-37	13 -1

tr-des	des	max.zero	poly. disc.	poly. coefficients
5	5	4.8691	612569	1 -10 32 -37 14 -1
5	5	5.0361	729621	1 -10 32 -38 14 -1
5	5	5.0062	756781	1 -10 32 -38 15 -1
5	5	4.9809	179024	1 -10 32 -38 16 -2
5	5	5.1449	420460	1 -10 32 -39 15 -1
5	5	5.1199	706481	1 -10 32 -39 16 -1
5	5	5.0990	324301	1 -10 32 -39 17 -2
5	5	5.2186	356789	1 -10 32 -40 17 -1
5	5	5.2005	303952	1 -10 32 -40 18 -2
5	5	5.2742	65657	1 -10 32 -41 20 -3
5	5	4.5746	24217	1 -10 33 -40 12 -1
5	5	4.5112	186037	1 -10 33 -40 13 -1
5	5	4.4344	288385	1 -10 33 -40 14 -1
5	5	4.3329	220669	1 -10 33 -40 15 -1
5	5	4.1555	38569	1 -10 33 -40 16 -1
5	5	4.6620	427569	1 -10 33 -41 15 -1
5	5	4.6087	580484	1 -10 33 -41 16 -1
5	5	4.5472	416249	1 -10 33 -41 17 -1
5	5	4.7830	488149	1 -10 33 -42 17 -1
5	5	4.7414	580017	1 -10 33 -42 18 -1
5	5	4.7505	265504	1 -10 33 -42 18 -2
5	5	4.7056	331312	1 -10 33 -42 19 -2
5	5	4.6667	65657	1 -10 33 -42 20 -3
5	5	4.8863	373057	1 -10 33 -43 19 -1
5	5	4.8590	341692	1 -10 33 -43 20 -2
5	5	4.8302	161121	1 -10 33 -43 21 -3
5	5	4.9598	124817	1 -10 33 -44 22 -3
5	5	4.0541	81589	1 -10 34 -44 16 -1
5	5	4.3235	144209	1 -10 34 -45 18 -1
5	5	4.2232	245992	1 -10 34 -45 19 -1
5	5	4.0666	89417	1 -10 34 -45 20 -1
5	5	4.4304	307829	1 -10 34 -46 21 -1
5	5	4.3721	223952	1 -10 34 -46 22 -2
5	5	4.5497	149169	1 -10 34 -47 24 -3
5	5	4.5047	81589	1 -10 34 -47 25 -4
5	5	4.0385	38569	1 -10 35 -50 24 -1
5	5	4.1744	24217	1 -10 35 -51 27 -1
5	5	4.0431	24217	1 -10 35 -51 29 -5
5	6	4.5993	966125	1 -11 42 -67 45 -12 1
5	6	4.8452	1134389	1 -11 42 -68 46 -12 1
5	6	4.8031	1387029	1 -11 42 -68 47 -13 1
5	6	4.3293	1134389	1 -11 43 -72 50 -13 1
5	6	4.1890	592661	1 -11 43 -72 51 -14 1
5	6	4.5302	905177	1 -11 43 -73 53 -15 1
5	6	4.6970	966125	1 -11 43 -74 55 -14 1
5	6	4.1604	980125	1 -11 44 -78 59 -15 1
5	6	3.9777	453789	1 -11 44 -78 60 -16 1
5	6	4.2962	1134389	1 -11 44 -79 63 -18 1
5	6	3.7709	371293	1 -11 45 -84 70 -21 1
6	1	7.0000	1	1 -7
6	2	7.8730	60	1 -8 1
6	2	7.7417	56	1 -8 2
6	2	7.6056	52	1 -8 3
6	2	7.4641	48	1 -8 4
6	2	7.3166	44	1 -8 5
6	2	7.1623	40	1 -8 6
6	2	6.8284	32	1 -8 8

tr-deg	deg	max.zero	poly. disc.	poly. coefficients			
6	2	6.6458	28	1	-8	9	
6	2	6.4495	24	1	-8	10	
6	2	6.2361	20	1	-8	11	
6	2	5.7321	12	1	-8	13	
6	2	5.4142	8	1	-8	14	
6	3	8.2909	81	1	-9	6	-1
6	3	8.1569	788	1	-9	7	-1
6	3	8.0178	1489	1	-9	8	-1
6	3	7.8917	621	1	-9	9	-2
6	3	7.7217	2777	1	-9	10	-1
6	3	7.5630	3316	1	-9	11	-1
6	3	7.5844	2101	1	-9	11	-2
6	3	7.3957	3753	1	-9	12	-1
6	3	7.4188	2700	1	-9	12	-2
6	3	7.4416	1593	1	-9	12	-3
6	3	7.2182	4064	1	-9	13	-1
6	3	7.2434	3173	1	-9	13	-2
6	3	7.2682	2228	1	-9	13	-3
6	3	7.2926	1229	1	-9	13	-4
6	3	7.0283	4225	1	-9	14	-1
6	3	7.0561	3496	1	-9	14	-2
6	3	7.0833	2713	1	-9	14	-3
6	3	7.1101	1876	1	-9	14	-4
6	3	7.1364	985	1	-9	14	-5
6	3	6.8231	4212	1	-9	15	-1
6	3	6.8845	3024	1	-9	15	-3
6	3	6.9142	2349	1	-9	15	-4
6	3	6.9434	1620	1	-9	15	-5
6	3	6.9720	837	1	-9	15	-6
6	3	6.5980	4001	1	-9	16	-1
6	3	6.6334	3596	1	-9	16	-2
6	3	6.6679	3137	1	-9	16	-3
6	3	6.7344	2057	1	-9	16	-5
6	3	6.7664	1436	1	-9	16	-6
6	3	6.7978	761	1	-9	16	-7
6	3	6.3460	3568	1	-9	17	-1
6	3	6.3876	3325	1	-9	17	-2
6	3	6.4279	3028	1	-9	17	-3
6	3	6.4669	2677	1	-9	17	-4
6	3	6.5047	2272	1	-9	17	-5
6	3	6.5771	1300	1	-9	17	-7
6	3	6.6119	733	1	-9	17	-8
6	3	6.0541	2889	1	-9	18	-1
6	3	6.1055	2808	1	-9	18	-2
6	3	6.1545	2673	1	-9	18	-3
6	3	6.2015	2484	1	-9	18	-4
6	3	6.2466	2241	1	-9	18	-5
6	3	6.2899	1944	1	-9	18	-6
6	3	6.3318	1593	1	-9	18	-7
6	3	6.4115	729	1	-9	18	-9
6	3	5.6940	1940	1	-9	19	-1
6	3	5.7637	2021	1	-9	19	-2
6	3	5.8890	2021	1	-9	19	-4
6	3	5.9460	1940	1	-9	19	-5
6	3	6.0514	1616	1	-9	19	-7
6	3	6.1004	1373	1	-9	19	-8
6	3	6.1474	1076	1	-9	19	-9
6	3	5.1660	697	1	-9	20	-1
6	3	5.2924	940	1	-9	20	-2

tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
6	3	5.3977	1129	1	-9	20	-3	
6	3	5.4893	1264	1	-9	20	-4	
6	3	5.5712	1345	1	-9	20	-5	
6	3	5.7145	1345	1	-9	20	-7	
6	3	5.7785	1264	1	-9	20	-8	
6	3	5.8385	1129	1	-9	20	-9	
6	3	5.8951	940	1	-9	20	-10	
6	3	5.9488	697	1	-9	20	-11	
6	3	6.0489	49	1	-9	20	-13	
6	3	5.1451	621	1	-9	21	-6	
6	3	5.2618	756	1	-9	21	-7	
6	3	5.3615	837	1	-9	21	-8	
6	3	5.5289	837	1	-9	21	-10	
6	3	5.6017	756	1	-9	21	-11	
6	3	5.6691	621	1	-9	21	-12	
6	3	4.8342	257	1	-9	22	-9	
6	3	5.1284	473	1	-9	22	-11	
6	3	5.3301	473	1	-9	22	-13	
6	3	5.4909	257	1	-9	22	-15	
6	3	4.6751	148	1	-9	23	-13	
6	3	4.8608	229	1	-9	23	-14	
6	3	5.1149	229	1	-9	23	-16	
6	3	5.2143	148	1	-9	23	-17	
6	3	4.5321	81	1	-9	24	-17	
6	3	4.8794	81	1	-9	24	-19	
6	4	7.9974	10512	1	-10	17	-8	1
6	4	7.8294	6224	1	-10	18	-8	1
6	4	7.8513	25717	1	-10	18	-9	1
6	4	7.6750	35537	1	-10	19	-9	1
6	4	7.6985	41984	1	-10	19	-10	1
6	4	7.4868	33709	1	-10	20	-9	1
6	4	7.5126	65856	1	-10	20	-10	1
6	4	7.5380	62109	1	-10	20	-11	1
6	4	7.5598	14656	1	-10	20	-12	2
6	4	7.2840	23377	1	-10	21	-9	1
6	4	7.3127	74304	1	-10	21	-10	1
6	4	7.3409	98537	1	-10	21	-11	1
6	4	7.3686	87952	1	-10	21	-12	1
6	4	7.3648	7232	1	-10	21	-12	2
6	4	7.3921	33097	1	-10	21	-13	2
6	4	7.0626	8069	1	-10	22	-9	1
6	4	7.0951	70400	1	-10	22	-10	1
6	4	7.1269	114629	1	-10	22	-11	1
6	4	7.1580	133712	1	-10	22	-12	1
6	4	7.1884	119957	1	-10	22	-13	1
6	4	7.2141	56144	1	-10	22	-14	2
6	4	7.2394	12357	1	-10	22	-15	3
6	4	6.8908	113337	1	-10	23	-11	1
6	4	6.9266	152944	1	-10	23	-12	1
6	4	6.9613	169809	1	-10	23	-13	1
6	4	6.9564	26569	1	-10	23	-13	2
6	4	6.9952	156672	1	-10	23	-14	1
6	4	6.9904	71696	1	-10	23	-14	2
6	4	7.0606	8112	1	-10	23	-16	1
6	4	7.0515	32368	1	-10	23	-16	3
6	4	6.5801	39744	1	-10	24	-10	1
6	4	6.6241	97997	1	-10	24	-11	1
6	4	6.6666	148432	1	-10	24	-12	1
6	4	6.7076	185517	1	-10	24	-13	1

tr-deg	deg	max.zero	poly. disc.	poly. coefficients		
6	4	6.7473	203072	1 -10	24 -14	1
6	4	6.7415	65232	1 -10	24 -14	2
6	4	6.7857	194269	1 -10	24 -15	1
6	4	6.7801	104693	1 -10	24 -15	2
6	4	6.8176	116032	1 -10	24 -16	2
6	4	6.8122	25808	1 -10	24 -16	3
6	4	6.8593	67037	1 -10	24 -17	1
6	4	6.8488	56749	1 -10	24 -17	3
6	4	6.8896	21200	1 -10	24 -18	2
6	4	6.2543	21056	1 -10	25 -10	1
6	4	6.3107	72329	1 -10	25 -11	1
6	4	6.3641	123344	1 -10	25 -12	1
6	4	6.4150	169649	1 -10	25 -13	1
6	4	6.4636	206144	1 -10	25 -14	1
6	4	6.4562	45296	1 -10	25 -14	2
6	4	6.5101	227081	1 -10	25 -15	1
6	4	6.5031	97473	1 -10	25 -15	2
6	4	6.5549	226064	1 -10	25 -16	1
6	4	6.5482	133696	1 -10	25 -16	2
6	4	6.5915	146921	1 -10	25 -17	2
6	4	6.5851	55585	1 -10	25 -17	3
6	4	6.6396	129344	1 -10	25 -18	1
6	4	6.6272	83520	1 -10	25 -18	3
6	4	6.6799	17609	1 -10	25 -19	1
6	4	6.6619	35537	1 -10	25 -19	4
6	4	6.7074	31312	1 -10	25 -20	3
6	4	6.6957	2000	1 -10	25 -20	5
6	4	6.7400	2777	1 -10	25 -21	4
6	4	5.9121	40437	1 -10	26 -11	1
6	4	5.9880	81232	1 -10	26 -12	1
6	4	6.0577	125157	1 -10	26 -13	1
6	4	6.1225	168192	1 -10	26 -14	1
6	4	6.1122	21200	1 -10	26 -14	2
6	4	6.1831	205669	1 -10	26 -15	1
6	4	6.1736	71293	1 -10	26 -15	2
6	4	6.2403	232272	1 -10	26 -16	1
6	4	6.2313	116800	1 -10	26 -16	2
6	4	6.2944	242037	1 -10	26 -17	1
6	4	6.2860	151757	1 -10	26 -17	2
6	4	6.2775	35013	1 -10	26 -17	3
6	4	6.3380	169552	1 -10	26 -18	2
6	4	6.3299	80448	1 -10	26 -18	3
6	4	6.3952	183957	1 -10	26 -19	1
6	4	6.3800	107749	1 -10	26 -19	3
6	4	6.4423	100944	1 -10	26 -20	1
6	4	6.4351	123968	1 -10	26 -20	2
6	4	6.4206	57600	1 -10	26 -20	4
6	4	6.4739	75669	1 -10	26 -21	3
6	4	6.4598	19429	1 -10	26 -21	5
6	4	6.5479	12197	1 -10	26 -23	5
6	4	5.2460	6809	1 -10	27 -11	1
6	4	5.4229	26032	1 -10	27 -12	1
6	4	5.5549	55377	1 -10	27 -13	1
6	4	5.6638	91904	1 -10	27 -14	1
6	4	5.7582	132025	1 -10	27 -15	1
6	4	5.7426	35537	1 -10	27 -15	2
6	4	5.8422	171504	1 -10	27 -16	1
6	4	5.9186	205457	1 -10	27 -17	1
6	4	5.9061	113481	1 -10	27 -17	2
6	4	5.8934	10273	1 -10	27 -17	3

tr-des	des	max.zero	poly. disc.	poly. coefficients
6	4	5.9888	228352	1 -10 27 -18 1
6	4	5.9774	148496	1 -10 27 -18 2
6	4	5.9659	53568	1 -10 27 -18 3
6	4	6.0436	172849	1 -10 27 -19 2
6	4	6.1152	215600	1 -10 27 -20 1
6	4	6.0956	121072	1 -10 27 -20 3
6	4	6.0856	41216	1 -10 27 -20 4
6	4	6.1729	165649	1 -10 27 -21 1
6	4	6.1638	161609	1 -10 27 -21 2
6	4	6.1452	75289	1 -10 27 -21 4
6	4	6.2276	76032	1 -10 27 -22 1
6	4	6.2190	110416	1 -10 27 -22 2
6	4	6.2103	114368	1 -10 27 -22 3
6	4	6.2632	62473	1 -10 27 -23 3
6	4	6.2549	74849	1 -10 27 -23 4
6	4	6.2381	7537	1 -10 27 -23 6
6	4	6.2980	43376	1 -10 27 -24 5
6	4	6.3797	2624	1 -10 27 -26 7
6	4	4.9224	8525	1 -10 28 -15 1
6	4	5.1999	45392	1 -10 28 -16 1
6	4	5.1601	14656	1 -10 28 -16 2
6	4	5.3655	87149	1 -10 28 -17 1
6	4	5.3382	40709	1 -10 28 -17 2
6	4	5.4934	129344	1 -10 28 -18 1
6	4	5.4719	74064	1 -10 28 -18 2
6	4	5.6005	166877	1 -10 28 -19 1
6	4	5.5825	109621	1 -10 28 -19 2
6	4	5.5639	48173	1 -10 28 -19 3
6	4	5.6783	141632	1 -10 28 -20 2
6	4	5.6623	81232	1 -10 28 -20 3
6	4	5.7776	204317	1 -10 28 -21 1
6	4	5.7495	111213	1 -10 28 -21 3
6	4	5.7349	48389	1 -10 28 -21 4
6	4	5.8538	190784	1 -10 28 -22 1
6	4	5.8412	168784	1 -10 28 -22 2
6	4	5.8154	79184	1 -10 28 -22 4
6	4	5.8020	14656	1 -10 28 -22 5
6	4	5.9241	145709	1 -10 28 -23 1
6	4	5.9126	149189	1 -10 28 -23 2
6	4	5.9009	133117	1 -10 28 -23 3
6	4	5.8769	48461	1 -10 28 -23 5
6	4	5.9895	60752	1 -10 28 -24 1
6	4	5.9789	96576	1 -10 28 -24 2
6	4	5.9681	109008	1 -10 28 -24 3
6	4	5.9571	99584	1 -10 28 -24 4
6	4	5.9347	21312	1 -10 28 -24 6
6	4	6.0309	49757	1 -10 28 -25 3
6	4	6.0208	71861	1 -10 28 -25 4
6	4	6.0105	69805	1 -10 28 -25 5
6	4	6.0710	38720	1 -10 28 -26 5
6	4	6.0612	44752	1 -10 28 -26 6
6	4	6.1098	24749	1 -10 28 -27 7
6	4	4.9458	34704	1 -10 29 -20 1
6	4	4.8800	16448	1 -10 29 -20 2
6	4	5.1307	56137	1 -10 29 -21 2
6	4	5.0919	30273	1 -10 29 -21 3
6	4	5.3183	124992	1 -10 29 -22 1
6	4	5.2651	61504	1 -10 29 -22 3
6	4	5.4403	150057	1 -10 29 -23 1
6	4	5.4194	123425	1 -10 29 -23 2

tr-deg	deg	max.zero	poly. disc.	poly. coefficients
6	4	5.3750	55665	1 -10 29 -23 4
6	4	5.3513	17609	1 -10 29 -23 5
6	4	5.5443	152272	1 -10 29 -24 1
6	4	5.5265	137152	1 -10 29 -24 2
6	4	5.5082	112848	1 -10 29 -24 3
6	4	5.4697	42832	1 -10 29 -24 5
6	4	5.6359	123729	1 -10 29 -25 1
6	4	5.6203	127273	1 -10 29 -25 2
6	4	5.5880	96825	1 -10 29 -25 4
6	4	5.5539	26569	1 -10 29 -25 6
6	4	5.7184	55872	1 -10 29 -26 1
6	4	5.7045	85232	1 -10 29 -26 2
6	4	5.6903	97728	1 -10 29 -26 3
6	4	5.6758	94896	1 -10 29 -26 4
6	4	5.6609	78272	1 -10 29 -26 5
6	4	5.6302	9792	1 -10 29 -26 7
6	4	5.7684	43449	1 -10 29 -27 3
6	4	5.7553	65905	1 -10 29 -27 4
6	4	5.7420	70729	1 -10 29 -27 5
6	4	5.7284	59457	1 -10 29 -27 6
6	4	5.8163	33424	1 -10 29 -28 5
6	4	5.8039	46912	1 -10 29 -28 6
6	4	5.8621	24417	1 -10 29 -29 7
6	4	5.8504	26873	1 -10 29 -29 8
6	4	5.9063	14400	1 -10 29 -30 9
6	4	4.6301	11344	1 -10 30 -24 1
6	4	4.9579	62181	1 -10 30 -25 1
6	4	4.9107	45373	1 -10 30 -25 2
6	4	4.8564	29237	1 -10 30 -25 3
6	4	4.7064	5125	1 -10 30 -25 5
6	4	5.1407	91904	1 -10 30 -26 1
6	4	5.1095	79056	1 -10 30 -26 2
6	4	5.0759	63040	1 -10 30 -26 3
6	4	5.0397	45392	1 -10 30 -26 4
6	4	4.9559	11344	1 -10 30 -26 6
6	4	5.2796	92389	1 -10 30 -27 1
6	4	5.2554	90941	1 -10 30 -27 2
6	4	5.2300	82485	1 -10 30 -27 3
6	4	5.2033	68557	1 -10 30 -27 4
6	4	5.1750	50693	1 -10 30 -27 5
6	4	5.1131	9301	1 -10 30 -27 7
6	4	5.3948	54864	1 -10 30 -28 1
6	4	5.3747	72256	1 -10 30 -28 2
6	4	5.3322	76032	1 -10 30 -28 4
6	4	5.3098	65488	1 -10 30 -28 5
6	4	5.2863	48704	1 -10 30 -28 6
6	4	5.4595	42565	1 -10 30 -29 3
6	4	5.4412	58397	1 -10 30 -29 4
6	4	5.4222	62613	1 -10 30 -29 5
6	4	5.3824	42341	1 -10 30 -29 7
6	4	5.5201	32000	1 -10 30 -30 5
6	4	5.5032	44496	1 -10 30 -30 6
6	4	5.4858	44608	1 -10 30 -30 7
6	4	5.4679	33872	1 -10 30 -30 8
6	4	5.5773	23301	1 -10 30 -31 7
6	4	5.5454	24917	1 -10 30 -31 9
6	4	5.6314	15952	1 -10 30 -32 9
6	4	5.6167	16448	1 -10 30 -32 10
6	4	5.6829	8789	1 -10 30 -33 11
6	4	4.7480	35537	1 -10 31 -29 1

tr-des	des	max.zero	poly. disc.	poly. coefficients				
6	4	4.6844	26825	1	-10	31	-29	2
6	4	4.6050	16609	1	-10	31	-29	3
6	4	4.9654	41984	1	-10	31	-30	1
6	4	4.9281	44688	1	-10	31	-30	2
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6	4	4.8422	35600	1	-10	31	-30	4
6	4	4.6597	8768	1	-10	31	-30	7
6	4	5.1215	2777	1	-10	31	-31	1
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6	4	5.1518	30512	1	-10	31	-32	5
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6	4	5.0664	28928	1	-10	31	-32	8
6	4	5.0344	18736	1	-10	31	-32	9
6	4	5.2306	23297	1	-10	31	-33	7
6	4	5.2068	28473	1	-10	31	-33	8
6	4	5.1559	17417	1	-10	31	-33	10
6	4	5.2814	19664	1	-10	31	-34	10
6	4	5.2592	14272	1	-10	31	-34	11
6	4	5.3696	10889	1	-10	31	-35	11
6	4	5.3502	10273	1	-10	31	-35	12
6	4	5.4321	5744	1	-10	31	-36	13
6	4	4.5529	11197	1	-10	32	-33	1
6	4	4.3636	7053	1	-10	32	-33	3
6	4	4.5929	14656	1	-10	32	-34	5
6	4	4.5166	11344	1	-10	32	-34	6
6	4	4.8329	4205	1	-10	32	-35	5
6	4	4.7453	16317	1	-10	32	-35	7
6	4	4.6935	15317	1	-10	32	-35	8
6	4	4.6337	11661	1	-10	32	-35	9
6	4	4.4667	2525	1	-10	32	-35	11
6	4	4.8260	14656	1	-10	32	-36	10
6	4	4.7817	11344	1	-10	32	-36	11
6	4	4.9688	11197	1	-10	32	-37	11
6	4	4.8996	7053	1	-10	32	-37	13
6	4	5.0590	7488	1	-10	32	-38	13
6	4	5.0303	6224	1	-10	32	-38	14
6	4	5.1401	3981	1	-10	32	-39	15
6	4	4.2283	2624	1	-10	33	-38	7
6	4	4.2631	2777	1	-10	33	-39	11
6	4	4.4955	4752	1	-10	33	-40	13
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6	4	4.7746	2624	1	-10	33	-42	17
6	4	4.1935	725	1	-10	34	-45	19
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6	5	7.3172	24217	1	-11	31	-31	10 -1
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6	5	7.0571	36497	1	-11	32	-31	11 -1
6	5	7.1320	698569	1	-11	32	-33	11 -1
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6	5	6.8096	698569	1	-11	33	-32	11 -1
6	5	6.8970	1062137	1	-11	33	-34	11 -1
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6	5	6.9325	1788353	1	-11	33	-35	12 -1

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6	5	6.5258	1062137	1 -11	34 -33	11	-1
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6	5	6.7216	1539213	1 -11	34 -37	12	-1
6	5	6.7146	3190969	1 -11	34 -37	13	-1
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6	5	6.7540	2787077	1 -11	34 -38	14	-1
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6	5	5.9380	36497	1 -11	35 -31	10	-1
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6	5	6.1825	983729	1 -11	35 -34	11	-1
6	5	6.2432	1182913	1 -11	35 -35	12	-1
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6	5	6.3003	70601	1 -11	35 -36	13	-1
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6	5	6.4331	2302312	1 -11	35 -38	12	-1
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6	5	6.4722	4666849	1 -11	35 -39	14	-1
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6	5	6.5184	4288081	1 -11	35 -40	15	-1
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6	5	6.5627	3300129	1 -11	35 -41	16	-1
6	5	6.5561	1284557	1 -11	35 -41	17	-2
6	5	6.6055	1706737	1 -11	35 -42	17	-1
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6	5	6.6345	144209	1 -11	35 -43	20	-3
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6	5	6.1582	1296549	1 -11	36 -40	12	-1
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6	5	6.2055	5598157	1 -11	36 -41	14	-1
6	5	6.1944	5774177	1 -11	36 -41	15	-1
6	5	6.2815	920896	1 -11	36 -42	13	-1
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6	5	6.3646	1999312	1 -11	36 -44	17	-1
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6	5	6.3568	1207552	1 -11	36 -44	18	-2
6	5	6.3474	2321989	1 -11	36 -44	19	-2

tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
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6	5	6.3966	1686952	1	-11	36	-45	20 -2
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6	5	5.4553	903377	1	-11	37	-39	12 -1
6	5	5.3879	233489	1	-11	37	-39	14 -1
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6	5	5.5051	135076	1	-11	37	-40	16 -2
6	5	5.7251	684617	1	-11	37	-41	12 -1
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6	5	5.8744	6641136	1	-11	37	-43	15 -1
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6	5	5.9357	598729	1	-11	37	-44	17 -2
6	5	5.9211	2363492	1	-11	37	-44	18 -2
6	5	6.0283	5441617	1	-11	37	-45	16 -1
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6	5	6.0022	5905433	1	-11	37	-45	18 -1
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6	5	6.0906	2868777	1	-11	37	-46	17 -1
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6	5	6.0665	5311081	1	-11	37	-46	19 -1
6	5	6.0685	2828449	1	-11	37	-46	19 -2
6	5	6.0561	3302660	1	-11	37	-46	20 -2
6	5	6.0457	726369	1	-11	37	-46	21 -3
6	5	6.1381	2517296	1	-11	37	-47	19 -1
6	5	6.1268	4100609	1	-11	37	-47	20 -1
6	5	6.1286	2233072	1	-11	37	-47	20 -2
6	5	6.1171	3016709	1	-11	37	-47	21 -2
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6	5	6.1764	404744	1	-11	37	-48	22 -3
6	5	6.1655	1404537	1	-11	37	-48	23 -3
6	5	6.2206	749769	1	-11	37	-49	24 -3
6	5	6.2119	422077	1	-11	37	-49	25 -4
6	5	5.1420	868097	1	-11	38	-43	13 -1
6	5	5.0853	1141637	1	-11	38	-43	14 -1
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6	5	5.2839	3000400	1	-11	38	-44	15 -1
6	5	5.2441	2306637	1	-11	38	-44	16 -1
6	5	5.2088	236549	1	-11	38	-44	17 -2
6	5	5.5060	1219961	1	-11	38	-45	13 -1
6	5	5.4809	3348733	1	-11	38	-45	14 -1
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6	5	5.4266	4910237	1	-11	38	-45	16 -1

tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
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6	5	5.3716	1132684	1	-11	38	-45	18 -2
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6	5	5.5426	6508112	1	-11	38	-46	17 -1
6	5	5.5186	4650757	1	-11	38	-46	18 -1
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6	5	5.7176	904469	1	-11	38	-47	14 -1
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6	5	5.6620	7323977	1	-11	38	-47	17 -1
6	5	5.6422	7502509	1	-11	38	-47	18 -1
6	5	5.6218	5328369	1	-11	38	-47	19 -1
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6	5	5.5865	288633	1	-11	38	-47	21 -3
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6	5	5.7304	7600592	1	-11	38	-48	19 -1
6	5	5.7335	2442869	1	-11	38	-48	19 -2
6	5	5.7125	5644525	1	-11	38	-48	20 -1
6	5	5.7156	3910992	1	-11	38	-48	20 -2
6	5	5.6973	3516901	1	-11	38	-48	21 -2
6	5	5.6817	1217869	1	-11	38	-48	22 -3
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6	5	5.7941	5492617	1	-11	38	-49	21 -1
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6	5	5.7805	3756204	1	-11	38	-49	22 -2
6	5	5.7667	1868393	1	-11	38	-49	23 -3
6	5	5.8833	3356752	1	-11	38	-50	21 -1
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6	5	5.8564	3536069	1	-11	38	-50	23 -2
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6	5	5.8311	535221	1	-11	38	-50	25 -4
6	5	5.9377	2199817	1	-11	38	-51	23 -1
6	5	5.9264	2526424	1	-11	38	-51	24 -2
6	5	5.9287	1021221	1	-11	38	-51	24 -3
6	5	5.9149	1989409	1	-11	38	-51	25 -3
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6	5	5.9810	1002413	1	-11	38	-52	26 -3
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6	5	4.6371	101833	1	-11	39	-47	14 -1
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6	5	5.0115	1786033	1	-11	39	-48	15 -1
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6	5	5.2680	951305	1	-11	39	-49	14 -1
6	5	5.2345	2337264	1	-11	39	-49	15 -1
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6	5	5.1593	4226768	1	-11	39	-49	17 -1

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6	5	5.5653	4822817	1 -11	39 -53	24	-1
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6	5	5.5726	1255209	1 -11	39 -53	24	-3
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6	5	5.5305	2510665	1 -11	39 -53	26	-3
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6	5	5.5123	1255781	1 -11	39 -53	27	-4
6	5	5.6543	2886769	1 -11	39 -54	25	-1
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6	5	5.6425	1753772	1 -11	39 -54	26	-3
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6	5	5.6271	954409	1 -11	39 -54	27	-4
6	5	5.6079	1545616	1 -11	39 -54	28	-4
6	5	5.5916	501289	1 -11	39 -54	29	-5
6	5	5.7075	1415969	1 -11	39 -55	28	-3
6	5	5.6934	1343261	1 -11	39 -55	29	-4
6	5	5.6789	767625	1 -11	39 -55	30	-5
6	5	5.7786	38569	1 -11	39 -56	29	-1
6	5	5.7581	516553	1 -11	39 -56	31	-5

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6	5	4.9621	638597	1 -11	40 -53	16	-1
6	5	4.9093	1478777	1 -11	40 -53	17	-1
6	5	4.8482	2019581	1 -11	40 -53	18	-1
6	5	4.7745	2008889	1 -11	40 -53	19	-1
6	5	4.6775	1385549	1 -11	40 -53	20	-1
6	5	4.7011	396520	1 -11	40 -53	20	-2
6	5	4.5101	310097	1 -11	40 -53	21	-1
6	5	5.0536	1933264	1 -11	40 -54	19	-1
6	5	5.0094	3275621	1 -11	40 -54	20	-1
6	5	5.0186	563792	1 -11	40 -54	20	-2
6	5	4.9601	3846464	1 -11	40 -54	21	-1
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6	5	4.9160	1867840	1 -11	40 -54	22	-2
6	5	4.8373	2498000	1 -11	40 -54	23	-1
6	5	4.8521	1823261	1 -11	40 -54	23	-2
6	5	4.7534	1102709	1 -11	40 -54	24	-1
6	5	4.7730	1240016	1 -11	40 -54	24	-2
6	5	4.6628	422077	1 -11	40 -54	25	-2
6	5	4.6907	394064	1 -11	40 -54	25	-3
6	5	5.1709	1174809	1 -11	40 -55	21	-1
6	5	5.1356	3579733	1 -11	40 -55	22	-1
6	5	5.1427	1271932	1 -11	40 -55	22	-2
6	5	5.0975	4758345	1 -11	40 -55	23	-1
6	5	5.0559	4548309	1 -11	40 -55	24	-1
6	5	5.0728	740877	1 -11	40 -55	24	-3
6	5	5.0099	3030481	1 -11	40 -55	25	-1
6	5	5.0194	3034648	1 -11	40 -55	25	-2
6	5	5.0288	1480337	1 -11	40 -55	25	-3
6	5	4.9689	1932860	1 -11	40 -55	26	-2
6	5	4.9796	1636853	1 -11	40 -55	26	-3
6	5	4.9233	1083633	1 -11	40 -55	27	-3
6	5	4.8713	470752	1 -11	40 -55	28	-4
6	5	4.8098	65657	1 -11	40 -55	29	-5
6	5	5.2419	2807573	1 -11	40 -56	24	-1
6	5	5.2477	961616	1 -11	40 -56	24	-2
6	5	5.2105	4555472	1 -11	40 -56	25	-1
6	5	5.1769	4105829	1 -11	40 -56	26	-1
6	5	5.1835	3720448	1 -11	40 -56	26	-2
6	5	5.1901	1949893	1 -11	40 -56	26	-3
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6	5	5.1551	2502096	1 -11	40 -56	27	-3
6	5	5.1621	414677	1 -11	40 -56	27	-4
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6	5	5.0844	1123541	1 -11	40 -56	29	-4
6	5	5.3350	1284557	1 -11	40 -57	26	-1
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6	5	5.2851	3183304	1 -11	40 -57	28	-2
6	5	5.2611	2479569	1 -11	40 -57	29	-3
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6	5	5.2421	398885	1 -11	40 -57	30	-5
6	5	5.2097	844417	1 -11	40 -57	31	-5
6	5	5.4037	179024	1 -11	40 -58	29	-3
6	5	5.3793	1918149	1 -11	40 -58	30	-3
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6	5	5.3635	629584	1 -11	40 -58	31	-5
6	5	5.3373	1125317	1 -11	40 -58	32	-5
6	5	5.3151	463341	1 -11	40 -58	33	-6
6	5	5.4734	562169	1 -11	40 -59	31	-1

tr-deg	deg	max.zero	poly. disc.	poly. coefficients			
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6	5	5.4266	611084	1 -11	40 -59	34	-6
6	5	5.4072	124817	1 -11	40 -59	35	-7
6	5	5.5330	138917	1 -11	40 -60	34	-3
6	5	4.2818	180769	1 -11	41 -57	20	-1
6	5	4.6373	796520	1 -11	41 -58	22	-1
6	5	4.5364	1095497	1 -11	41 -58	23	-1
6	5	4.3730	470752	1 -11	41 -58	24	-1
6	5	4.4217	387268	1 -11	41 -58	24	-2
6	5	4.7649	1562544	1 -11	41 -59	25	-1
6	5	4.7783	630757	1 -11	41 -59	25	-2
6	5	4.6927	2112497	1 -11	41 -59	26	-1
6	5	4.7250	454057	1 -11	41 -59	26	-3
6	5	4.6008	1590832	1 -11	41 -59	27	-1
6	5	4.6437	737904	1 -11	41 -59	27	-3
6	5	4.4628	537921	1 -11	41 -59	28	-1
6	5	4.5011	708592	1 -11	41 -59	28	-2
6	5	4.5333	592041	1 -11	41 -59	28	-3
6	5	4.9220	466809	1 -11	41 -60	27	-1
6	5	4.8719	2338412	1 -11	41 -60	28	-1
6	5	4.8826	1413764	1 -11	41 -60	28	-2
6	5	4.8149	2443489	1 -11	41 -60	29	-1
6	5	4.8395	1363777	1 -11	41 -60	29	-3
6	5	4.8511	372289	1 -11	41 -60	29	-4
6	5	4.7631	1767652	1 -11	41 -60	30	-2
6	5	4.7775	1572696	1 -11	41 -60	30	-3
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6	5	4.7363	157457	1 -11	41 -60	31	-5
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6	5	4.5294	176281	1 -11	41 -60	33	-5
6	5	5.0082	1476577	1 -11	41 -61	30	-1
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6	5	4.9916	422069	1 -11	41 -61	31	-4
6	5	4.9181	307145	1 -11	41 -61	32	-1
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6	5	4.9567	354969	1 -11	41 -61	32	-5
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6	5	4.8054	414677	1 -11	41 -61	35	-6
6	5	4.7489	101833	1 -11	41 -61	36	-7
6	5	5.0867	1027081	1 -11	41 -62	33	-1
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6	5	5.0569	522052	1 -11	41 -62	34	-2
6	5	5.0790	442552	1 -11	41 -62	34	-5
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6	5	5.0085	746052	1 -11	41 -62	36	-6
6	5	4.9734	354969	1 -11	41 -62	37	-7
6	5	5.1714	512433	1 -11	41 -63	36	-3
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6	5	5.1315	449617	1 -11	41 -63	38	-7
6	5	5.1036	186037	1 -11	41 -63	39	-8
6	5	5.2481	180769	1 -11	41 -64	39	-5
6	5	5.2125	36497	1 -11	41 -64	41	-9
6	5	4.1298	147109	1 -11	42 -63	28	-1
6	5	4.3894	582992	1 -11	42 -64	31	-1
6	5	4.4191	320837	1 -11	42 -64	31	-2
6	5	4.1853	210557	1 -11	42 -64	32	-1
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tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
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6	5	4.4453	484105	1 -11	42 -65	35	-1	
6	5	4.4978	712753	1 -11	42 -65	35	-3	
6	5	4.5206	504568	1 -11	42 -65	35	-4	
6	5	4.5418	205225	1 -11	42 -65	35	-5	
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6	5	4.4323	355309	1 -11	42 -65	36	-5	
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6	5	4.7447	450277	1 -11	42 -66	36	-1	
6	5	4.6809	303952	1 -11	42 -66	37	-1	
6	5	4.7226	186037	1 -11	42 -66	37	-4	
6	5	4.6393	528149	1 -11	42 -66	38	-3	
6	5	4.6708	541477	1 -11	42 -66	38	-5	
6	5	4.5732	224773	1 -11	42 -66	39	-4	
6	5	4.6287	207184	1 -11	42 -66	39	-7	
6	5	4.5400	288565	1 -11	42 -66	40	-7	
6	5	4.4481	106069	1 -11	42 -66	41	-8	
6	5	4.7796	357977	1 -11	42 -67	41	-5	
6	5	4.8026	233489	1 -11	42 -67	41	-7	
6	5	4.7082	144209	1 -11	42 -67	43	-9	
6	5	4.8940	170701	1 -11	42 -68	44	-7	
6	5	4.9924	36497	1 -11	42 -69	47	-9	
6	5	4.0912	117688	1 -11	43 -70	40	-1	
6	5	4.1515	135076	1 -11	43 -70	40	-2	
6	5	4.0851	65657	1 -11	43 -70	41	-5	
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6	5	4.3127	176281	1 -11	43 -71	44	-5	
6	5	4.2684	81509	1 -11	43 -71	45	-8	
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6	5	4.3476	65657	1 -11	43 -72	49	-9	
6	5	4.4039	38569	1 -11	43 -72	49	-11	
6	5	4.5441	38569	1 -11	43 -73	52	-11	
6	5	3.9190	14641	1 -11	44 -77	55	-11	
6	6	6.9041	434581	1 -12	44 -67	44	-12	1
6	6	6.5442	966125	1 -12	45 -67	42	-11	1
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6	6	6.2673	2666432	1 -12	46 -70	45	-12	1
6	6	6.3330	12483261	1 -12	46 -71	46	-12	1
6	6	6.3945	7649984	1 -12	46 -72	47	-12	1
6	6	6.3851	5160733	1 -12	46 -72	48	-13	1
6	6	6.4908	3662336	1 -12	46 -74	51	-14	1
6	6	5.8501	7649984	1 -12	47 -72	46	-12	1
6	6	5.9467	10121113	1 -12	47 -73	47	-12	1
6	6	6.0490	8498752	1 -12	47 -74	47	-12	1
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6	6	6.1257	2661761	1 -12	47 -75	48	-12	1
6	6	6.0988	31967893	1 -12	47 -75	50	-13	1
6	6	6.1719	26327997	1 -12	47 -76	51	-13	1
6	6	6.1605	25935680	1 -12	47 -76	52	-14	1
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6	6	5.3450	1292517	1 -12	48 -75	48	-12	1
6	6	5.3039	1312625	1 -12	48 -75	49	-13	1
6	6	5.4919	14978149	1 -12	48 -76	50	-13	1
6	6	5.7041	3916917	1 -12	48 -77	48	-12	1

tr-des	des	max.zero	poly. disc.	poly. coefficients						
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6	6	5.6323	27339617	1	-12	48	-77	51	-13	1
6	6	5.6095	8047141	1	-12	48	-77	52	-14	1
6	6	5.7702	23790953	1	-12	48	-78	51	-13	1
6	6	5.7481	30073325	1	-12	48	-78	52	-13	1
6	6	5.7292	38564352	1	-12	48	-78	53	-14	1
6	6	5.8672	17501524	1	-12	48	-79	52	-13	1
6	6	5.8481	19303153	1	-12	48	-79	53	-13	1
6	6	5.8514	4601153	1	-12	48	-79	53	-14	1
6	6	5.8319	56844101	1	-12	48	-79	54	-14	1
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6	6	5.9371	2415125	1	-12	48	-80	54	-13	1
6	6	5.9227	44692288	1	-12	48	-80	55	-14	1
6	6	5.9080	50364533	1	-12	48	-80	56	-15	1
6	6	5.9782	23957597	1	-12	48	-81	58	-16	1
6	6	5.9529	3389609	1	-12	48	-81	60	-19	2
6	6	6.0510	3662336	1	-12	48	-82	59	-14	1
6	6	6.0385	1397493	1	-12	48	-82	60	-15	1
6	6	6.0435	1134389	1	-12	48	-82	60	-17	1
6	6	6.1001	9117749	1	-12	48	-83	62	-16	1
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6	6	4.8391	2666432	1	-12	49	-80	54	-14	1
6	6	5.3326	11035429	1	-12	49	-81	52	-13	1
6	6	5.2438	5160733	1	-12	49	-81	54	-13	1
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6	6	5.2016	28145473	1	-12	49	-81	55	-14	1
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6	6	5.3282	7633856	1	-12	49	-82	58	-16	1
6	6	5.5628	31073233	1	-12	49	-83	56	-14	1
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6	6	5.5403	23468204	1	-12	49	-83	57	-15	1
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6	6	5.6534	14631616	1	-12	49	-84	58	-14	1
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6	6	5.7941	3184733	1	-12	49	-86	63	-15	1
6	6	5.7779	32059584	1	-12	49	-86	64	-16	1
6	6	5.7613	16831813	1	-12	49	-86	65	-17	1
6	6	5.8946	8420544	1	-12	49	-88	70	-20	1
6	6	4.6699	3086597	1	-12	50	-85	56	-14	1
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6	6	4.9022	13009408	1	-12	50	-86	59	-14	1
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6	6	4.8184	20237501	1	-12	50	-86	60	-15	1
6	6	4.8426	4141568	1	-12	50	-86	60	-16	1
6	6	4.6929	7649984	1	-12	50	-86	61	-16	1
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tr-deg	deg	max.zero	poly. disc.	poly. coefficients				
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6	6	5.1318	32830081	1 -12	50 -87	61 -16		1
6	6	5.0764	64778125	1 -12	50 -87	62 -16		1
6	6	4.9970	3486377	1 -12	50 -87	63 -15		1
6	6	5.0254	43074529	1 -12	50 -87	63 -17		1
6	6	4.9663	8287853	1 -12	50 -87	64 -18		1
6	6	4.9104	4308028	1 -12	50 -87	65 -20		2
6	6	5.3063	24307021	1 -12	50 -88	62 -15		1
6	6	5.2755	67241664	1 -12	50 -88	63 -16		1
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6	6	5.2262	22616869	1 -12	50 -88	64 -15		1
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6	6	5.1355	9596117	1 -12	50 -88	67 -21		2
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6	6	5.5446	7764889	1 -12	50 -91	71 -18		1
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6	6	5.5102	10885592	1 -12	50 -91	73 -22		2
6	6	5.6009	24277952	1 -12	50 -92	75 -22		1
6	6	5.5848	5163008	1 -12	50 -92	76 -24		2
6	6	5.6684	1134389	1 -12	50 -93	78 -24		1
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6	6	4.6827	4305125	1 -12	51 -92	67 -15		1
6	6	4.7334	39113989	1 -12	51 -92	67 -17		1
6	6	4.7555	14572352	1 -12	51 -92	67 -18		1
6	6	4.5508	7649984	1 -12	51 -92	68 -16		1
6	6	4.6320	26608448	1 -12	51 -92	68 -18		1
6	6	4.4525	4224413	1 -12	51 -92	69 -19		1
6	6	4.9977	966125	1 -12	51 -93	68 -15		1
6	6	4.9494	30360953	1 -12	51 -93	69 -16		1
6	6	4.8791	14599577	1 -12	51 -93	70 -16		1
6	6	4.8945	53777189	1 -12	51 -93	70 -17		1
6	6	4.9234	44617157	1 -12	51 -93	70 -19		1
6	6	4.8305	50724209	1 -12	51 -93	71 -18		1
6	6	4.8650	33918033	1 -12	51 -93	71 -20		1
6	6	4.8778	7764889	1 -12	51 -93	71 -21		2
6	6	4.7516	27956333	1 -12	51 -93	72 -19		1
6	6	4.7956	4126869	1 -12	51 -93	72 -21		1
6	6	4.8112	15184532	1 -12	51 -93	72 -22		2

tr-des	des	max.zero	poly. disc.	poly. coefficients			
6	6	4.6433	4588625	1 -12	51 -93	73 -20	1
6	6	5.1131	5689408	1 -12	51 -94	71 -16	1
6	6	5.0745	34521941	1 -12	51 -94	72 -17	1
6	6	5.0842	44183232	1 -12	51 -94	72 -18	1
6	6	5.0322	33681152	1 -12	51 -94	73 -18	1
6	6	5.0430	81955789	1 -12	51 -94	73 -19	1
6	6	5.0638	12410453	1 -12	51 -94	73 -21	1
6	6	4.9976	75262016	1 -12	51 -94	74 -20	1
6	6	5.0297	16196689	1 -12	51 -94	74 -23	2
6	6	4.9466	37077669	1 -12	51 -94	75 -21	1
6	6	4.9574	9186752	1 -12	51 -94	75 -22	2
6	6	4.9007	6856697	1 -12	51 -94	76 -23	2
6	6	4.9418	4170688	1 -12	51 -94	76 -26	3
6	6	5.2129	6550837	1 -12	51 -95	74 -17	1
6	6	5.1883	35362604	1 -12	51 -95	75 -19	1
6	6	5.1542	26426137	1 -12	51 -95	76 -20	1
6	6	5.1626	71377877	1 -12	51 -95	76 -21	1
6	6	5.1693	5030996	1 -12	51 -95	76 -22	2
6	6	5.1267	68663153	1 -12	51 -95	77 -22	1
6	6	5.0877	16470677	1 -12	51 -95	78 -23	1
6	6	5.0956	24252372	1 -12	51 -95	78 -24	2
6	6	5.1220	3549501	1 -12	51 -95	78 -27	3
6	6	5.2579	2540864	1 -12	51 -96	79 -22	1
6	6	5.2648	37173485	1 -12	51 -96	79 -23	1
6	6	5.2347	43373504	1 -12	51 -96	80 -24	1
6	6	5.2090	16626944	1 -12	51 -96	81 -26	2
6	6	5.2152	1397493	1 -12	51 -96	81 -27	3
6	6	5.3549	980125	1 -12	51 -97	82 -25	1
6	6	5.3289	15213449	1 -12	51 -97	83 -26	1
6	6	5.3120	8793749	1 -12	51 -97	84 -29	3
6	6	5.3982	2495261	1 -12	51 -98	87 -31	3
6	6	4.2872	3184733	1 -12	52 -97	72 -18	1
6	6	4.5251	9979841	1 -12	52 -98	75 -17	1
6	6	4.5554	5947904	1 -12	52 -98	75 -18	1
6	6	4.3091	2323397	1 -12	52 -98	76 -17	1
6	6	4.4312	20873565	1 -12	52 -98	76 -19	1
6	6	4.5083	4366125	1 -12	52 -98	76 -21	1
6	6	4.3577	6619648	1 -12	52 -98	77 -22	1
6	6	4.7282	10525997	1 -12	52 -99	78 -18	1
6	6	4.6525	21342577	1 -12	52 -99	79 -19	1
6	6	4.6747	34674577	1 -12	52 -99	79 -20	1
6	6	4.5545	2565429	1 -12	52 -99	80 -20	1
6	6	4.5851	34943060	1 -12	52 -99	80 -21	1
6	6	4.6125	47024373	1 -12	52 -99	80 -22	1
6	6	4.6321	7313969	1 -12	52 -99	80 -23	2
6	6	4.6602	592661	1 -12	52 -99	80 -24	1
6	6	4.4561	9944521	1 -12	52 -99	81 -22	1
6	6	4.4999	31137577	1 -12	52 -99	81 -23	1
6	6	4.5288	13431004	1 -12	52 -99	81 -24	2
6	6	4.2701	2235125	1 -12	52 -99	82 -24	1
6	6	4.5020	2782261	1 -12	52 -99	82 -28	3
6	6	4.8767	5279033	1 -12	52-100	81 -19	1
6	6	4.8376	22272501	1 -12	52-100	82 -21	1
6	6	4.7947	44358313	1 -12	52-100	83 -23	1
6	6	4.8104	33846208	1 -12	52-100	83 -24	1
6	6	4.8072	10338304	1 -12	52-100	83 -24	2
6	6	4.7279	13875392	1 -12	52-100	84 -24	1
6	6	4.7469	53269013	1 -12	52-100	84 -25	1
6	6	4.7612	29838656	1 -12	52-100	84 -26	2
6	6	4.6702	29156544	1 -12	52-100	85 -26	1

tr-deg	deg	max.zero	poly. disc.	poly. coefficients						
6	6	4.7049	3706688	1 -12	52-100	85 -28	3			
6	6	4.5943	9816064	1 -12	52-100	86 -28	2			
6	6	4.6172	6554149	1 -12	52-100	86 -29	3			
6	6	4.9447	23619796	1 -12	52-101	86 -25	1			
6	6	4.9097	39319769	1 -12	52-101	87 -27	1			
6	6	4.9195	18743852	1 -12	52-101	87 -28	2			
6	6	4.8579	23772069	1 -12	52-101	88 -28	1			
6	6	4.8799	15185109	1 -12	52-101	88 -30	3			
6	6	4.8242	13322689	1 -12	52-101	89 -31	3			
6	6	4.7737	1868969	1 -12	52-101	90 -33	4			
6	6	5.0380	11767669	1 -12	52-102	90 -29	1			
6	6	4.9979	5431808	1 -12	52-102	91 -30	1			
6	6	5.0143	10814656	1 -12	52-102	91 -32	3			
6	6	4.9722	9011589	1 -12	52-102	92 -33	3			
6	6	5.0700	1202933	1 -12	52-103	96 -38	5			
6	6	4.1035	2286997	1 -12	53-104	85 -21	1			
6	6	3.9499	1075648	1 -12	53-104	86 -24	1			
6	6	4.4063	3477989	1 -12	53-105	88 -21	1			
6	6	4.3064	7070500	1 -12	53-105	89 -23	1			
6	6	4.1452	4418197	1 -12	53-105	90 -25	1			
6	6	4.2314	12224617	1 -12	53-105	90 -26	1			
6	6	4.2910	5398157	1 -12	53-105	90 -27	1			
6	6	4.1001	3319769	1 -12	53-105	91 -29	2			
6	6	4.5172	11473949	1 -12	53-106	93 -27	1			
6	6	4.4422	17831909	1 -12	53-106	94 -29	1			
6	6	4.4745	10998592	1 -12	53-106	94 -30	1			
6	6	4.4676	12150464	1 -12	53-106	94 -30	2			
6	6	4.3446	13294693	1 -12	53-106	95 -31	1			
6	6	4.3699	5689408	1 -12	53-106	95 -32	3			
6	6	4.4107	7905501	1 -12	53-106	95 -33	3			
6	6	4.2350	4170688	1 -12	53-106	96 -34	3			
6	6	4.2890	2661761	1 -12	53-106	96 -35	4			
6	6	4.6660	6139004	1 -12	53-107	97 -31	1			
6	6	4.6134	14505253	1 -12	53-107	98 -33	1			
6	6	4.6298	5758036	1 -12	53-107	98 -34	2			
6	6	4.5670	11329929	1 -12	53-107	99 -36	3			
6	6	4.5856	5611169	1 -12	53-107	99 -37	4			
6	6	4.4652	2501557	1 -12	53-107	100 -37	3			
6	6	4.5143	2812877	1 -12	53-107	100 -39	5			
6	6	4.7537	3706688	1 -12	53-108	102 -38	3			
6	6	4.7191	3477989	1 -12	53-108	103 -41	5			
6	6	4.0758	2323397	1 -12	54-112	104 -33	1			
6	6	3.9696	1259712	1 -12	54-112	105 -36	1			
6	6	4.2354	3486377	1 -12	54-113	109 -39	1			
6	6	4.1341	2565429	1 -12	54-113	110 -42	3			
6	6	4.1849	1868969	1 -12	54-113	110 -43	4			
6	6	4.3975	1202933	1 -12	54-114	114 -47	5			
6	6	4.3342	1081856	1 -12	54-114	115 -50	7			
6	7	5.4470	39829313	1 -13	61-131	136 -66	14	-1		
6	7	5.5788	75602713	1 -13	61-132	138 -67	14	-1		
6	7	5.6483	88537609	1 -13	61-133	142 -71	15	-1		
6	7	4.7567	20134393	1 -13	62-135	140 -67	14	-1		
6	7	5.0813	55311169	1 -13	62-136	142 -68	14	-1		
6	7	4.9645	79044293	1 -13	62-136	144 -71	15	-1		
6	7	5.1978	228132361	1 -13	62-137	146 -72	15	-1		
6	7	5.1506	147049181	1 -13	62-137	147 -73	15	-1		
6	7	5.1084	39829313	1 -13	62-137	148 -75	16	-1		
6	7	5.3273	97212489	1 -13	62-138	149 -74	15	-1		
6	7	5.2977	297916193	1 -13	62-138	150 -76	16	-1		

tr-deg	deg	max.zero	poly. disc.	poly. coefficients
6	7	5.2662	25367689	1 -13 62-138 151 -78 17 -1
6	7	5.4119	160481173	1 -13 62-139 153 -78 16 -1
6	7	5.3860	41455873	1 -13 62-139 154 -80 17 -1
6	7	4.6623	63128113	1 -13 63-142 153 -75 15 -1
6	7	4.5407	107704601	1 -13 63-142 154 -77 16 -1
6	7	4.8327	100269173	1 -13 63-143 157 -78 16 -1
6	7	4.8535	261502945	1 -13 63-143 157 -79 16 -1
6	7	4.7659	175929793	1 -13 63-143 158 -80 16 -1
6	7	4.7862	339240017	1 -13 63-143 158 -81 17 -1
6	7	4.6750	93679973	1 -13 63-143 159 -82 17 -1
6	7	4.7024	75602713	1 -13 63-143 159 -83 18 -1
6	7	5.0256	79397476	1 -13 63-144 160 -80 16 -1
6	7	4.9948	338757233	1 -13 63-144 161 -83 17 -1
6	7	4.9461	384493129	1 -13 63-144 162 -85 18 -1
6	7	4.8906	69012929	1 -13 63-144 163 -87 19 -1
6	7	5.1109	238845553	1 -13 63-145 165 -87 18 -1
6	7	5.0819	100907057	1 -13 63-145 166 -90 20 -1
6	7	4.3501	75630121	1 -13 64-149 168 -86 17 -1
6	7	4.5832	118768997	1 -13 64-150 172 -89 18 -1
6	7	4.4801	134589773	1 -13 64-150 173 -91 18 -1
6	7	4.5158	307340809	1 -13 64-150 173 -92 19 -1
6	7	4.3616	100660489	1 -13 64-150 174 -94 20 -1
6	7	4.4175	91138133	1 -13 64-150 174 -95 21 -1
6	7	4.7712	69012929	1 -13 64-151 176 -93 18 -1
6	7	4.7232	234884549	1 -13 64-151 177 -96 20 -1
6	7	4.6688	174368473	1 -13 64-151 178 -99 22 -1
6	7	4.8481	20134393	1 -13 64-152 182-104 24 -1
6	7	4.1760	58355513	1 -13 65-157 188-102 20 -1
6	7	4.3399	55311169	1 -13 65-158 194-113 26 -1