(* Goal: Algebraic solution of ZFP if n=10 and s=5 and exemplarily one coefficient, $a^*_{8,10}(5)$, is explicitly expressed as a root object (see Appendix 3 in[6]) *)

(* The proper monic Zolotarev polynomial of degree n= 10 and with parameter s=5 can be generated by *)

(* $Z_{10,5}(x) = \sum_{k=0}^{10} a^*_{k,10}(5)\, x^k = (R_{10,\alpha,\beta}(x))\,/.\,s\to 5\,/.\,\alpha\to \underbrace{\mathrm{Root}[F_{m(10),5}(\alpha),4]}_{\text{Nullstelle}}\,/.\,\beta\to \underbrace{\mathrm{Root}[G_{m(10),5}(\beta),4]}_{\text{Nullstelle}}$ *)

(* The first insertion, $(R_{10,\alpha,\beta}(x))\,/.\,s\to 5$, will yield the following polynomial of degree n=10, still depending on α and β: *)

Out[∘]=

$$\begin{aligned}
&\frac{1}{4\,128\,768}\\
&(-3\,955\,365\,672\,464\,128 - 206\,438\,400\, x^9 + 4\,128\,768\, x^{10} - 87\,535\,\alpha^8 + \alpha^7\,(6\,031\,600 - 6440\,\beta) +\\
&1\,112\,172\,811\,187\,200\,\beta - 94\,946\,672\,592\,640\,\beta^2 - 258\,499\,116\,800\,\beta^3 + 446\,595\,548\,000\,\beta^4 -\\
&21\,430\,337\,600\,\beta^5 + 208\,135\,760\,\beta^6 + 6\,031\,600\,\beta^7 - 87\,535\,\beta^8 -\\
&2\,580\,480\, x^8\,(-1996 + \alpha^2 - 2\,\alpha\,(-10 + \beta) + 20\,\beta + \beta^2) + 140\,\alpha^6\,(1\,486\,684 - 331\,140\,\beta + 10\,477\,\beta^2) +\\
&280\,\alpha^5\,(-76\,536\,920 + 11\,153\,356\,\beta - 373\,110\,\beta^2 + 383\,\beta^3) -\\
&10\,\alpha^4\,(-44\,659\,554\,800 + 4\,834\,115\,360\,\beta + 55\,170\,696\,\beta^2 - 15\,770\,120\,\beta^3 + 296\,009\,\beta^4) + 40\,\alpha^3\\
&(-6\,462\,477\,920 - 20\,443\,249\,712\,\beta + 3\,844\,923\,440\,\beta^2 - 222\,603\,624\,\beta^3 + 3\,942\,530\,\beta^4 + 2681\,\beta^5) +\\
&20\,\alpha^2\,(-4\,747\,333\,629\,632 + 1\,577\,695\,359\,680\,\beta - 179\,308\,853\,552\,\beta^2 +\\
&\quad 7\,689\,846\,880\,\beta^3 - 27\,585\,348\,\beta^4 - 5\,223\,540\,\beta^5 + 73\,339\,\beta^6) -\\
&40\,\alpha\,(-27\,804\,320\,279\,680 + 8\,080\,729\,935\,168\,\beta - 788\,847\,679\,840\,\beta^2 + 20\,443\,249\,712\,\beta^3 +\\
&\quad 1\,208\,528\,840\,\beta^4 - 78\,073\,492\,\beta^5 + 1\,158\,990\,\beta^6 + 161\,\beta^7) -\\
&1\,720\,320\, x^7\,(49\,720 + \alpha^3 - 1500\,\beta - 60\,\beta^2 + \beta^3 - \alpha^2\,(60 + \beta) - \alpha\,(1500 - 160\,\beta + \beta^2)) -\\
&26\,880\, x^6\,(-39\,584\,336 + 15\,\alpha^4 + 2\,395\,680\,\beta + 59\,784\,\beta^2 - 3800\,\beta^3 + 15\,\beta^4 + 4\,\alpha^3\,(-950 + 21\,\beta) +\\
&\quad \alpha^2\,(59\,784 + 4760\,\beta - 198\,\beta^2) + 28\,\alpha\,(85\,560 - 10\,556\,\beta + 170\,\beta^2 + 3\,\beta^3)) +\\
&10\,752\, x^5\,(-984\,035\,440 + 16\,\alpha^5 + 99\,500\,000\,\beta + 480\,280\,\beta^2 - 244\,648\,\beta^3 + 4325\,\beta^4 +\\
&\quad 16\,\beta^5 - 5\,\alpha^4\,(-865 + 48\,\beta) + 4\,\alpha^3\,(-61\,162 + 1975\,\beta + 56\,\beta^2) +\\
&\quad \alpha^2\,(480\,280 + 444\,648\,\beta - 28\,290\,\beta^2 + 224\,\beta^3) +\\
&\quad \alpha\,(99\,500\,000 - 14\,946\,480\,\beta + 444\,648\,\beta^2 + 7900\,\beta^3 - 240\,\beta^4)) +\\
&1120\, x^4\,(78\,247\,056\,320 + 215\,\alpha^6 + \alpha^5\,(7860 - 1210\,\beta) - 11\,889\,677\,760\,\beta +\\
&\quad 242\,597\,712\,\beta^2 + 34\,217\,440\,\beta^3 - 1\,553\,100\,\beta^4 + 7860\,\beta^5 + 215\,\beta^6 -\\
&\quad 5\,\alpha^4\,(310\,620 - 24\,980\,\beta + 187\,\beta^2) + 4\,\alpha^3\,(8\,554\,360 - 221\,028\,\beta - 37\,030\,\beta^2 + 965\,\beta^3) +\\
&\quad \alpha^2\,(242\,597\,712 - 106\,167\,520\,\beta + 8\,381\,624\,\beta^2 - 148\,120\,\beta^3 - 935\,\beta^4) -\\
&\quad 2\,\alpha\,(5\,944\,838\,880 - 1\,113\,127\,088\,\beta + 53\,083\,760\,\beta^2 + 442\,056\,\beta^3 - 62\,450\,\beta^4 + 605\,\beta^5)) +\\
&320\, x^3\,(-1\,944\,334\,519\,040 + 507\,\alpha^7 + 414\,131\,188\,800\,\beta - 21\,013\,009\,440\,\beta^2 - 965\,230\,192\,\beta^3 +\\
&\quad 109\,949\,280\,\beta^4 - 2\,342\,004\,\beta^5 - 14\,210\,\beta^6 + 507\,\beta^7 - 7\,\alpha^6\,(2030 + 177\,\beta) -\\
&\quad 7\,\alpha^5\,(334\,572 - 43\,420\,\beta + 891\,\beta^2) + \alpha^4\,(109\,949\,280 - 10\,880\,164\,\beta + 81\,410\,\beta^2 + 6969\,\beta^3) +\\
&\quad \alpha^3\,(-965\,230\,192 - 46\,647\,360\,\beta + 18\,866\,968\,\beta^2 - 834\,440\,\beta^3 + 6969\,\beta^4) +\\
&\quad \alpha^2\,(-21\,013\,009\,440 + 6\,831\,924\,592\,\beta - 646\,007\,360\,\beta^2 + 18\,866\,968\,\beta^3 + 81\,410\,\beta^4 - 6237\,\beta^5) +\\
&\quad \alpha\,(414\,131\,188\,800 - 97\,102\,964\,800\,\beta + 6\,831\,924\,592\,\beta^2 -\\
&\qquad 46\,647\,360\,\beta^3 - 10\,880\,164\,\beta^4 + 303\,940\,\beta^5 - 1239\,\beta^6)) +\\
&5\, x^2\,(773\,331\,957\,533\,440 + 17\,507\,\alpha^8 - 219\,758\,384\,921\,600\,\beta + 18\,935\,314\,545\,920\,\beta^2 +\\
&\quad 44\,014\,688\,000\,\beta^3 - 88\,971\,134\,560\,\beta^4 + 4\,284\,306\,880\,\beta^5 - 41\,675\,312\,\beta^6 - 1\,206\,320\,\beta^7 +
\end{aligned}$$

$$
\begin{aligned}
&17\,507\,\beta^{8} + 8\,\alpha^{7}\,(-150\,790 + 161\,\beta) - 28\,\alpha^{6}\,\left(1\,488\,404 - 331\,140\,\beta + 10\,477\,\beta^{2}\right) - \\
&56\,\alpha^{5}\,\left(-76\,505\,480 + 11\,148\,516\,\beta - 373\,110\,\beta^{2} + 383\,\beta^{3}\right) + \\
&2\,\alpha^{4}\,\left(-44\,485\,567\,280 + 4\,820\,126\,560\,\beta + 55\,275\,416\,\beta^{2} - 15\,770\,120\,\beta^{3} + 296\,009\,\beta^{4}\right) - \\
&8\,\alpha^{3}\,\left(-5\,501\,836\,000 - 20\,468\,061\,296\,\beta + 3\,840\,776\,080\,\beta^{2} - 222\,495\,544\,\beta^{3} + \right.\\
&\quad\left. 3\,942\,530\,\beta^{4} + 2681\,\beta^{5}\right) - 4\,\alpha^{2}\,\left(-4\,733\,828\,636\,480 + 1\,571\,743\,581\,120\,\beta - \right.\\
&\quad\left. 178\,839\,216\,496\,\beta^{2} + 7\,681\,552\,160\,\beta^{3} - 27\,637\,708\,\beta^{4} - 5\,223\,540\,\beta^{5} + 73\,339\,\beta^{6}\right) + \\
&8\,\alpha\,\left(-27\,469\,798\,115\,200 + 8\,018\,196\,067\,520\,\beta - 785\,871\,790\,560\,\beta^{2} + 20\,468\,061\,296\,\beta^{3} + \right.\\
&\quad\left. 1\,205\,031\,640\,\beta^{4} - 78\,039\,612\,\beta^{5} + 1\,158\,990\,\beta^{6} + 161\,\beta^{7}\right)\Big) - \\
x\,\Big(&-4\,588\,218\,808\,356\,608 + 87\,535\,\alpha^{8}\,(-1 + \beta) + 5\,833\,986\,004\,439\,808\,\beta - 2\,068\,991\,785\,196\,288\,\beta^{2} + \\
&347\,442\,809\,541\,632\,\beta^{3} - 32\,125\,727\,497\,632\,\beta^{4} + 1\,702\,670\,167\,904\,\beta^{5} - 50\,635\,524\,464\,\beta^{6} + \\
&804\,336\,864\,\beta^{7} - 8\,045\,375\,\beta^{8} + 87\,375\,\beta^{9} + 40\,\alpha^{7}\,\left(154\,846 - 155\,007\,\beta + 4217\,\beta^{2}\right) - \\
&140\,\alpha^{6}\,\left(-1\,454\,204 + 1\,788\,176\,\beta - 310\,249\,\beta^{2} + 11\,589\,\beta^{3}\right) - \\
&56\,\alpha^{5}\,\left(396\,064\,408 - 453\,567\,988\,\beta + 72\,941\,778\,\beta^{2} - 3\,818\,233\,\beta^{3} + 58\,683\,\beta^{4}\right) + \\
&10\,\alpha^{4}\,\left(48\,182\,582\,000 - 53\,365\,120\,656\,\beta + 8\,826\,987\,800\,\beta^{2} - 472\,491\,152\,\beta^{3} + \right.\\
&\quad\left. 5\,358\,111\,\beta^{4} + 115\,929\,\beta^{5}\right) + 8\,\alpha^{3}\,\left(-71\,250\,619\,232 - 32\,820\,906\,128\,\beta + \right.\\
&\quad\left. 80\,309\,683\,104\,\beta^{2} - 17\,724\,980\,024\,\beta^{3} + 1\,465\,638\,234\,\beta^{4} - 51\,050\,981\,\beta^{5} + 609\,531\,\beta^{6}\right) + \\
&4\,\alpha^{2}\,\left(-25\,416\,392\,105\,920 + 33\,852\,618\,515\,584\,\beta - 11\,131\,776\,233\,264\,\beta^{2} + \right.\\
&\quad\left. 1\,631\,976\,766\,416\,\beta^{3} - 123\,430\,771\,156\,\beta^{4} + 4\,879\,891\,936\,\beta^{5} - 91\,659\,197\,\beta^{6} + 590\,177\,\beta^{7}\right) + \\
&8\,\alpha\,\left(155\,720\,899\,510\,400 - 200\,028\,790\,253\,760\,\beta + 66\,897\,912\,882\,592\,\beta^{2} - 10\,345\,756\,518\,352\,\beta^{3} + \right.\\
&\quad\left. 861\,245\,913\,832\,\beta^{4} - 39\,822\,513\,972\,\beta^{5} + 974\,926\,542\,\beta^{6} - 10\,832\,255\,\beta^{7} + 37\,205\,\beta^{8}\right)\Big)\Big)
\end{aligned}
$$

(* In particular,
eingegebenes Objekt
the coefficient at the monomial x^8 still depends on α and β and reads as follows: *)

Out[ ]=

$$-\frac{5}{8}\,\left(-1996 + \alpha^{2} - 2\,\alpha\,(-10 + \beta) + 20\,\beta + \beta^{2}\right)$$

(* The parameter α=Root[$F_{m(10),5}(\alpha)$,4] reads as follows: *)
Nullstelle

Root[– 902 916 165 996 751 513 267 465 124 012 438 757 643 +
Nullstelle

497 030 079 043 959 165 766 487 167 410 308 521 608 z +
470 883 066 714 140 740 028 574 167 286 333 402 852 z^{2} –
557 798 978 114 217 405 352 335 250 880 996 359 432 z^{3} +
259 013 736 742 139 314 918 477 218 957 964 415 402 z^{4} –
83 193 647 383 001 195 159 285 562 468 572 875 816 z^{5} +
28 369 267 147 681 697 861 493 967 384 484 760 276 z^{6} –
11 345 951 216 672 397 177 561 217 972 485 348 696 z^{7} +
4 079 173 571 680 846 230 384 260 645 929 158 011 z^{8} –
1 148 812 707 645 071 016 188 839 034 917 125 936 z^{9} +
250 484 915 089 243 384 275 766 057 659 535 048 z^{10} –
43 090 394 434 496 237 722 080 383 848 651 728 z^{11} +
5 968 383 847 559 379 235 587 852 922 918 988 z^{12} – 676 346 899 312 644 277 626 744 914 053 328 z^{13} +
63 406 360 100 365 984 051 933 030 508 488 z^{14} – 4 947 518 262 157 408 936 448 680 564 784 z^{15} +
321 577 999 263 242 640 193 712 465 979 z^{16} – 17 325 486 552 915 492 809 760 923 864 z^{17} +
764 987 697 016 314 011 428 866 644 z^{18} – 27 165 750 677 096 464 528 297 384 z^{19} +
754 175 359 578 274 067 183 274 z^{20} – 15 687 719 867 332 535 314 824 z^{21} +
228 565 012 549 821 980 004 z^{22} – 2 064 519 540 496 950 264 z^{23} + 8 614 550 657 858 229 z^{24}, 4]

(* Its numerical approximation is α=
50.00999900019994991409573635455414980184457752703811513253650482077630240833081663 1\
232223794748211330748530123173705 8`99. *)

(* The parameter β=Root[$G_{m(10),5}(\beta)$,4]reads as follows: *)
Nullstelle

Root[699 418 548 616 090 654 753 463 166 059 072 135 317 –
Nullstelle

84 207 831 373 473 311 471 706 906 185 414 478 888 z –
371 837 384 810 092 421 593 314 535 632 947 036 668 z^{2} +
122 865 656 875 400 379 934 222 858 584 911 236 072 z^{3} +
129 687 407 842 540 616 616 763 566 917 786 216 202 z^{4} –
141 325 764 249 690 682 953 736 637 695 719 688 504 z^{5} +
70 647 813 962 644 136 061 515 257 358 389 939 636 z^{6} –
23 604 294 425 519 612 340 823 362 672 487 440 264 z^{7} +
5 956 018 040 090 422 338 744 086 488 879 603 131 z^{8} –
1 217 268 457 459 881 655 728 371 366 358 229 264 z^{9} +
211 287 652 903 375 050 990 910 176 564 001 288 z^{10} –
32 012 249 323 523 839 383 892 776 116 007 792 z^{11} +
4 260 996 603 742 336 281 312 755 955 965 708 z^{12} – 493 557 433 703 568 550 792 089 460 796 912 z^{13} +
48 945 869 019 470 211 638 100 715 806 088 z^{14} – 4 088 305 591 477 239 921 535 504 695 696 z^{15} +
283 526 852 078 665 621 270 798 947 419 z^{16} – 16 109 845 494 607 840 705 573 877 576 z^{17} +
739 184 459 068 683 967 806 465 524 z^{18} – 26 891 262 796 373 169 491 380 216 z^{19} +
755 893 115 357 149 631 763 594 z^{20} – 15 788 521 297 375 495 758 936 z^{21} +
229 861 223 120 924 692 164 z^{22} – 2 070 464 775 274 999 656 z^{23} + 8 614 550 657 858 229 z^{24}, 4]

(* Its numerical approximation is β=
50.00999900019995011389586628458813430462469452829499924828257560314559338206416811 3\
8756828922706722601967380572112741`99. *)

(* After insertion,

Fläche nach dem Objekt

a numerical approximation of $Z_{10,5}(x)=\sum_{k=0}^{10} a^*_{k,10}(5)\,x^k$ reads as follows: *)

Out[∘]=

$-$0.0039058594921484511669549290174387722665296024886337151766018427336596415794748193
67 $-$
1.7576758183480505261293182177834731061943591590853975499341142506605109107170872840
x +
0.1601464868352267823508830153731194355098178978651348004984165351410468691422864137
91 x^2 +
23.436406507741427493322485212902212331652990391924206664824085837317845467452475118
3056 x^3 $-$
1.0937093842162663560227296318739105651223673050724553518502222847734332368438768280
46934 x^4 $-$
84.372812968628159989315902008499591059633481495707839995212629446035721654641488601
63164243 x^5 +
2.6874437618719383747338345347968061828024297378986471781099135725672752931081758636
357932072 x^6 +
112.49875024993751749475164946392856444579280624460085901303992019560626935454229601
2165776689500 x^7 $-$
2.7499750049987503498950329892785762809233507282026929115815059802012292838271106300
1314238074701 x^8 $-$
50.000000000000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000 x^9 +
1.0000000000000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000 x^{10}

(* To obtain a non-numerical explicit representation of $Z_{10,5}(x)=\sum_{k=0}^{10} a^*_{k,10}(5)\,x^k$ would require to insert into $(R_{10,\alpha,\beta}(x))$ /. s→5 the parameters α and β *)

(* In particular, inserting the parameters α and β into the coefficient at the

eingegebenes Objekt

monomial x^8 $\left(\text{i.e., into } -\frac{5}{8}\left(-1996+\alpha^2-2\,\alpha\,(-10+\beta)+20\,\beta+\beta^2\right)\right)$ would yield,

after simplification with RootReduce or FullSimplify,

reduziere auf Null·· vereinfache vollständig

the following algebraic representation of $a^*_{8,10}(5)$ as a root object: *)

```
Root[
Nullstelle
 -1 786 154 209 802 451 002 972 759 427 968 487 151 452 029 651 728 799 407 639 295 635 068 397 082
    203 209 400 177 001 953 125 -
  609 669 402 283 538 940 064 962 351 778 105 590 416 586 800 600 947 854 626 322 974 747 244 589 514
    636 993 408 203 125 000 z +
  14 065 049 508 440 152 464 640 540 540 273 080 874 274 960 792 390 609 169 876 582 299 521 406 218
    557 357 788 085 937 500 z^2 -
  151 644 396 136 269 517 420 537 591 671 668 698 662 291 198 974 943 286 974 771 385 459 752 798 534
    393 310 546 875 000 z^3 +
  1 034 230 604 547 796 776 894 311 813 388 800 222 396 217 413 745 783 240 608 643 078 907 588 289
    451 599 121 093 750 z^4 -
  5 024 914 765 274 801 563 771 944 009 102 429 931 695 283 939 155 677 138 996 369 663 362 725 677
    490 234 375 000 z^5 +
  18 525 952 105 958 034 810 709 332 606 630 760 338 002 035 331 088 431 649 304 996 067 017 868 041
    992 187 500 z^6 -
  53 864 412 863 332 279 824 097 453 356 521 821 046 949 689 890 166 470 307 609 262 109 185 791 015
    625 000 z^7 +
  126 674 139 176 457 908 238 718 970 995 577 561 835 058 163 022 076 650 012 130 064 226 837 158 203
    125 z^8 -
  245 158 102 934 475 621 588 720 737 350 126 855 222 640 626 413 210 252 772 627 352 050 781 250 000
   z^9 +
  395 141 149 943 474 384 086 541 487 309 901 808 801 450 907 453 130 982 006 914 013 671 875 000 z^10 -
  534 675 536 343 861 900 773 943 400 121 707 653 199 032 965 353 920 988 934 511 718 750 000 z^11 +
  610 408 680 346 008 995 559 084 191 546 226 619 764 247 071 897 049 596 575 195 312 500 z^12 -
  589 363 193 243 490 285 228 380 696 749 499 045 880 940 357 279 577 349 218 750 000 z^13 +
  481 268 800 440 643 409 158 707 973 922 718 780 320 349 080 587 281 171 875 000 z^14 -
  331 602 009 631 729 919 433 495 764 100 455 383 505 298 260 194 281 250 000 z^15 +
  191 838 742 991 889 260 376 287 186 647 873 491 989 258 474 983 203 125 z^16 -
  92 446 978 692 855 823 629 707 816 684 644 176 221 635 105 625 000 z^17 +
  36 673 710 264 764 661 364 347 661 637 419 565 379 970 187 500 z^18 -
  11 772 852 602 784 092 591 451 221 404 911 955 573 975 000 z^19 +
  2 982 568 473 064 831 329 440 330 772 506 936 613 750 z^20 -
  574 072 646 933 509 157 103 499 538 022 699 000 z^21 + 78 900 603 628 779 519 972 988 584 750 300 z^22 -
  6 898 845 416 722 982 294 850 842 760 z^23 + 288 421 901 218 258 609 913 307 z^24, 1]

(* Its numerical value is indeed *)
```

In[∘]:= **N[Root[**

Nullstelle

-1 786 154 209 802 451 002 972 759 427 968 487 151 452 029 651 728 799 407 639 295 635 068 397 082 203 209 400 177 001 953 125 -
609 669 402 283 538 940 064 962 351 778 105 590 416 586 800 600 947 854 626 322 974 747 244 589 514 636 993 408 203 125 000 z +
14 065 049 508 440 152 464 640 540 540 273 080 874 274 960 792 390 609 169 876 582 299 521 406 218 557 357 788 085 937 500 z^{2} -
151 644 396 136 269 517 420 537 591 671 668 698 662 291 198 974 943 286 974 771 385 459 752 798 534 393 310 546 875 000 z^{3} +
1 034 230 604 547 796 776 894 311 813 388 800 222 396 217 413 745 783 240 608 643 078 907 588 289 451 599 121 093 750 z^{4} -
5 024 914 765 274 801 563 771 944 009 102 429 931 695 283 939 155 677 138 996 369 663 362 725 677 490 234 375 000 z^{5} +
18 525 952 105 958 034 810 709 332 606 630 760 338 002 035 331 088 431 649 304 996 067 017 868 041 992 187 500 z^{6} -
53 864 412 863 332 279 824 097 453 356 521 821 046 949 689 890 166 470 307 609 262 109 185 791 015 625 000 z^{7} +
126 674 139 176 457 908 238 718 970 995 577 561 835 058 163 022 076 650 012 130 064 226 837 158 203 125 z^{8} -
245 158 102 934 475 621 588 720 737 350 126 855 222 640 626 413 210 252 772 627 352 050 781 250 000 z^{9} +
395 141 149 943 474 384 086 541 487 309 901 808 801 450 907 453 130 982 006 914 013 671 875 000 z^{10} -
534 675 536 343 861 900 773 943 400 121 707 653 199 032 965 353 920 988 934 511 718 750 000 z^{11} +
610 408 680 346 008 995 559 084 191 546 226 619 764 247 071 897 049 596 575 195 312 500 z^{12} -
589 363 193 243 490 285 228 380 696 749 499 045 880 940 357 279 577 349 218 750 000 z^{13} +
481 268 800 440 643 409 158 707 973 922 718 780 320 349 080 587 281 171 875 000 z^{14} -
331 602 009 631 729 919 433 495 764 100 455 383 505 298 260 194 281 250 000 z^{15} +
191 838 742 991 889 260 376 287 186 647 873 491 989 258 474 983 203 125 z^{16} -
92 446 978 692 855 823 629 707 816 684 644 176 221 635 105 625 000 z^{17} +
36 673 710 264 764 661 364 347 661 637 419 565 379 970 187 500 z^{18} -
11 772 852 602 784 092 591 451 221 404 911 955 573 975 000 z^{19} +
2 982 568 473 064 831 329 440 330 772 506 936 613 750 z^{20} -
574 072 646 933 509 157 103 499 538 022 699 000 z^{21} +
78 900 603 628 779 519 972 988 584 750 300 z^{22} -
6 898 845 416 722 982 294 850 842 760 z^{23} + 288 421 901 218 258 609 913 307 z^{24}, 1], 99]

Out[∘]=

-2.749975004998750349895032989278576280923350728202692911581505980201229283827110630013142380747007 99