

> # Set the parameters and functions

c := 'c':

d := 'd':

u := 'u':

$E3 := (9360000 c - 40478400) u^7 + (123624000 c^2 + 79477167 - 15600000 d^3 - 312878520 d) u^6$
 $+ (12480000 c^5 + 418993800 c^3 + 476863002 c - 91411200 d^4 - 860506665 d^2) u^5$
 $+ (23217600 c^6 + 621308436 c^4 + 1192157505 c^2 - 1040000 d^7 - 199260960 d^5$
 $- 1100550468 d^3) u^4 + (14018680 c^7 + 486042654 c^5 + 1589543340 c^3 - 155887303 d^6$
 $- 663541512 d^4) u^3 + (155487978 c^6 + 1192157505 c^4 - 43552080 d^7 - 215944200 d^5) u^2$
 $+ (476863002 c^5 - 13976040 d^7 - 134854731 d^6) u + 79477167 c^6 - 70008120 d^7 :$

print(Output);

find Sturm's sequence ` `

for j from 0 by 1 to 149 do

$c := \frac{403}{100} + \frac{j+1}{150} \cdot \left(\frac{404}{100} - \frac{403}{100} \right) :$

$d := \frac{403}{100} + \frac{j}{150} \cdot \left(\frac{404}{100} - \frac{403}{100} \right) :$

u := 'u':

S := sturmseq(E3, u);

signnum := sturm(S, u, 4, $\frac{542}{100}$);

with(ArrayTools) :

Slength := Size(S, 2);

X := Array(1 .. Slength);

Y := Array(1 .. Slength);

for i from 1 to Slength do

Find sgn $\left[s_{E_{3,i}}(4) \right]$

u := 4;

X[i] := signum(S[i]);

Find sgn $\left[s_{E_{3,i}}(5.42) \right]$

u := $\frac{542}{100}$:

Y[i] := signum(S[i]);

end do;

show the final results

print(['a'[460 + j], 'a'[461 + j], sgn(s['E'[3, 460 + j]](4)), sgn(s['E'[3, 460 + j]](5.42))]
= [evalf(d, 5), evalf(c, 5), X, Y]);

end do:

Output

$\left[a_{460}, a_{461}, \text{sgn}\left(s_{E_{3,460}}(4)\right), \text{sgn}\left(s_{E_{3,460}}(5.42)\right) \right] = [4.0300, 4.0301, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]]$
 $\left[a_{461}, a_{462}, \text{sgn}\left(s_{E_{3,461}}(4)\right), \text{sgn}\left(s_{E_{3,461}}(5.42)\right) \right] = [4.0301, 4.0301, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]]$
 $\left[a_{462}, a_{463}, \text{sgn}\left(s_{E_{3,462}}(4)\right), \text{sgn}\left(s_{E_{3,462}}(5.42)\right) \right] = [4.0301, 4.0302, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]]$
 $\left[a_{463}, a_{464}, \text{sgn}\left(s_{E_{3,463}}(4)\right), \text{sgn}\left(s_{E_{3,463}}(5.42)\right) \right] = [4.0302, 4.0303, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]]$

$$\begin{aligned}
& [a_{592}, a_{593}, \operatorname{sgn}(s_{E_{3,592}}(4)), \operatorname{sgn}(s_{E_{3,592}}(5.42))] = [4.0388, 4.0389, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{593}, a_{594}, \operatorname{sgn}(s_{E_{3,593}}(4)), \operatorname{sgn}(s_{E_{3,593}}(5.42))] = [4.0389, 4.0389, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{594}, a_{595}, \operatorname{sgn}(s_{E_{3,594}}(4)), \operatorname{sgn}(s_{E_{3,594}}(5.42))] = [4.0389, 4.0390, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{595}, a_{596}, \operatorname{sgn}(s_{E_{3,595}}(4)), \operatorname{sgn}(s_{E_{3,595}}(5.42))] = [4.0390, 4.0391, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{596}, a_{597}, \operatorname{sgn}(s_{E_{3,596}}(4)), \operatorname{sgn}(s_{E_{3,596}}(5.42))] = [4.0391, 4.0391, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{597}, a_{598}, \operatorname{sgn}(s_{E_{3,597}}(4)), \operatorname{sgn}(s_{E_{3,597}}(5.42))] = [4.0391, 4.0392, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{598}, a_{599}, \operatorname{sgn}(s_{E_{3,598}}(4)), \operatorname{sgn}(s_{E_{3,598}}(5.42))] = [4.0392, 4.0393, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{599}, a_{600}, \operatorname{sgn}(s_{E_{3,599}}(4)), \operatorname{sgn}(s_{E_{3,599}}(5.42))] = [4.0393, 4.0393, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{600}, a_{601}, \operatorname{sgn}(s_{E_{3,600}}(4)), \operatorname{sgn}(s_{E_{3,600}}(5.42))] = [4.0393, 4.0394, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{601}, a_{602}, \operatorname{sgn}(s_{E_{3,601}}(4)), \operatorname{sgn}(s_{E_{3,601}}(5.42))] = [4.0394, 4.0395, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{602}, a_{603}, \operatorname{sgn}(s_{E_{3,602}}(4)), \operatorname{sgn}(s_{E_{3,602}}(5.42))] = [4.0395, 4.0395, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{603}, a_{604}, \operatorname{sgn}(s_{E_{3,603}}(4)), \operatorname{sgn}(s_{E_{3,603}}(5.42))] = [4.0395, 4.0396, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{604}, a_{605}, \operatorname{sgn}(s_{E_{3,604}}(4)), \operatorname{sgn}(s_{E_{3,604}}(5.42))] = [4.0396, 4.0397, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{605}, a_{606}, \operatorname{sgn}(s_{E_{3,605}}(4)), \operatorname{sgn}(s_{E_{3,605}}(5.42))] = [4.0397, 4.0397, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{606}, a_{607}, \operatorname{sgn}(s_{E_{3,606}}(4)), \operatorname{sgn}(s_{E_{3,606}}(5.42))] = [4.0397, 4.0398, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{607}, a_{608}, \operatorname{sgn}(s_{E_{3,607}}(4)), \operatorname{sgn}(s_{E_{3,607}}(5.42))] = [4.0398, 4.0399, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{608}, a_{609}, \operatorname{sgn}(s_{E_{3,608}}(4)), \operatorname{sgn}(s_{E_{3,608}}(5.42))] = [4.0399, 4.0399, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]] \\
& [a_{609}, a_{610}, \operatorname{sgn}(s_{E_{3,609}}(4)), \operatorname{sgn}(s_{E_{3,609}}(5.42))] = [4.0399, 4.0400, [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1], [-1 \ 1 \ 1 \ 1 \ -1 \ -1 \ 1 \ -1]]
\end{aligned}$$

(1)

