

> # Set the parameters and functions

c := 'c':

d := 'd':

u := 'u':

A2 := (37440000 c - 161834400) u⁸ + (353464800 c² - 12480000 d³ - 1294675200 d) u⁷
 + (1268473440 c³ - 31200000 d⁵ - 2418000 d⁴ - 4705780824 d²) u⁶ + (27040000 c⁷
 + 107719560 c⁵ + 2675588499 c⁴ - 79440400 d⁶ - 9811537866 d³) u⁵ + (38110800 c⁸
 + 3623298666 c⁵ - 2080000 d⁹ - 134505800 d⁷ - 193587675 d⁶ - 12302778060 d⁴) u⁴
 + (17631640 c⁹ + 3636140160 c⁶ - 54539419 d⁸ - 586789818 d⁷ - 8427142836 d⁵) u³
 + (9505080 c⁹ + 2471900238 c⁷ - 491379183 d⁸ - 1650242448 d⁶) u² + (586739205 c⁸
 + 1360886958 c⁷ - 195834600 d⁹) u + 648166788 c⁸ - 149179680 d⁹:

print(Output);

find Sturm's sequence`

for j from 0 by 1 to 14 do

c := $\frac{4005}{1000} + \frac{j}{15} \cdot \left(\frac{401}{100} - \frac{4005}{1000} \right)$:

d := $\frac{4005}{1000} + \frac{j+1}{15} \cdot \left(\frac{401}{100} - \frac{4005}{1000} \right)$:

u := 'u':

S := sturmseq(A2, u);

signnum := sturm(S, u, 0, $\frac{5292}{1000}$);

with(ArrayTools) :

Slength := Size(S, 2);

X := Array(1 .. Slength);

Y := Array(1 .. Slength);

for i from 1 to Slength do

Find sgn $\left[s_{A_{2,i}}^{(0)} \right]$

u := 0;

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

Find sgn $\left[s_{A_{2,i}}^{(5.292)} \right]$

u := $\frac{5292}{1000}$;

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

end do;

show the final results

print(['a'[200 + j], 'a'[j + 201], sgn(s['A'[2, 200 + j]](0)), sgn(s['A'[2, 200 + j]](5.292))]
 = [evalf(c, 5), evalf(d, 5), X, Y]);

end do:

Output

$\left[a_{200}, a_{201}, \text{sgn}\left(s_{A_{2,200}}^{(0)}\right), \text{sgn}\left(s_{A_{2,200}}^{(5.292)}\right) \right] = [4.0050, 4.0053, [1 1 1 -1 1 1 -1 -1 -1], [1 -1 -1 1 1 1 -1 -1 -1]]$
 $\left[a_{201}, a_{202}, \text{sgn}\left(s_{A_{2,201}}^{(0)}\right), \text{sgn}\left(s_{A_{2,201}}^{(5.292)}\right) \right] = [4.0053, 4.0057, [1 1 1 -1 1 1 -1 -1 -1], [1 -1 -1 1 1 1 -1 -1 -1]]$
 $\left[a_{202}, a_{203}, \text{sgn}\left(s_{A_{2,202}}^{(0)}\right), \text{sgn}\left(s_{A_{2,202}}^{(5.292)}\right) \right] = [4.0057, 4.0060, [1 1 1 -1 1 1 -1 -1 -1], [1 -1 -1 1 1 1 -1 -1 -1]]$
 $\left[a_{203}, a_{204}, \text{sgn}\left(s_{A_{2,203}}^{(0)}\right), \text{sgn}\left(s_{A_{2,203}}^{(5.292)}\right) \right] = [4.0060, 4.0063, [1 1 1 -1 1 1 -1 -1 -1], [1 -1 -1 1 1 1 -1 -1 -1]]$

$$\begin{aligned}
& \left[a_{204}, a_{205}, \operatorname{sgn}\left(s_{A_{2,204}}(0)\right), \operatorname{sgn}\left(s_{A_{2,204}}(5.292)\right) \right] = [4.0063, 4.0067, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{205}, a_{206}, \operatorname{sgn}\left(s_{A_{2,205}}(0)\right), \operatorname{sgn}\left(s_{A_{2,205}}(5.292)\right) \right] = [4.0067, 4.0070, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{206}, a_{207}, \operatorname{sgn}\left(s_{A_{2,206}}(0)\right), \operatorname{sgn}\left(s_{A_{2,206}}(5.292)\right) \right] = [4.0070, 4.0073, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{207}, a_{208}, \operatorname{sgn}\left(s_{A_{2,207}}(0)\right), \operatorname{sgn}\left(s_{A_{2,207}}(5.292)\right) \right] = [4.0073, 4.0077, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{208}, a_{209}, \operatorname{sgn}\left(s_{A_{2,208}}(0)\right), \operatorname{sgn}\left(s_{A_{2,208}}(5.292)\right) \right] = [4.0077, 4.0080, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{209}, a_{210}, \operatorname{sgn}\left(s_{A_{2,209}}(0)\right), \operatorname{sgn}\left(s_{A_{2,209}}(5.292)\right) \right] = [4.0080, 4.0083, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{210}, a_{211}, \operatorname{sgn}\left(s_{A_{2,210}}(0)\right), \operatorname{sgn}\left(s_{A_{2,210}}(5.292)\right) \right] = [4.0083, 4.0087, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{211}, a_{212}, \operatorname{sgn}\left(s_{A_{2,211}}(0)\right), \operatorname{sgn}\left(s_{A_{2,211}}(5.292)\right) \right] = [4.0087, 4.0090, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{212}, a_{213}, \operatorname{sgn}\left(s_{A_{2,212}}(0)\right), \operatorname{sgn}\left(s_{A_{2,212}}(5.292)\right) \right] = [4.0090, 4.0093, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{213}, a_{214}, \operatorname{sgn}\left(s_{A_{2,213}}(0)\right), \operatorname{sgn}\left(s_{A_{2,213}}(5.292)\right) \right] = [4.0093, 4.0097, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]] \\
& \left[a_{214}, a_{215}, \operatorname{sgn}\left(s_{A_{2,214}}(0)\right), \operatorname{sgn}\left(s_{A_{2,214}}(5.292)\right) \right] = [4.0097, 4.0100, [1\ 1\ 1\ -1\ 1\ 1\ -1\ -1\ -1], [1\ -1\ -1\ 1\ 1\ 1\ -1\ -1\ -1]]
\end{aligned}$$

(1)

