

> # Set the parameters and functions

a := 'a':

b := 'b':

u := 'u':

$$B := 18u^8 + (144a - 6b^2)u^7 + (-66b^3 + 6712a^2 - 15b^4)u^6 + (19040a^3 - 9770b^4 + 13a^6 + 18a^5)u^5 + (3508a^6 + 14a^7 + 18700a^4 - b^8 - 18164b^5)u^4 + (-7674b^6 - 311b^8 + 7120a^5 + 3158a^7)u^3 + (1400a^6 + 358a^7 - 317b^8)u^2 + (-422b^8 + 448a^7)u - 78b^8:$$

print(Output);

find Sturm's sequence

for j from 0 by 1 to 4 do

$$a := \frac{4106}{1000} + \frac{j+1}{5} \cdot \left(\frac{417}{100} - \frac{4106}{1000} \right):$$

$$b := \frac{4106}{1000} + \frac{j}{5} \cdot \left(\frac{417}{100} - \frac{4106}{1000} \right):$$

u := 'u':

S := sturmseq(B, u);

with(ArrayTools) :

Slength := Size(S, 2);

X := Array(1 .. Slength);

Y := Array(1 .. Slength);

for i from 1 to Slength do

Find sgn [s_{B_i}(0)]

u := 0;

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

Find sgn [s_{B_i}(6)]

u := 6;

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

end do;

show the final results

print(['a'[j], 'a'[j + 1], sgn(s['B'[j]](0)), sgn(s['B'[j]](6))]) = [evalf(b, 5), evalf(a, 5), X, Y];

end do:

Output

$$\left[a_0, a_1, \operatorname{sgn}(s_{B_0}(0)), \operatorname{sgn}(s_{B_0}(6)) \right] = \left[4.1060, 4.1188, [-1 \ -1 \ -1 \ 1 \ -1 \ 1 \ 1 \ 1 \ 1], [-1 \ -1 \ 1 \ 1 \ -1 \ -1 \ 1 \ 1 \ 1] \right]$$

$$[a_1, a_2, \operatorname{sgn}(s_{B_1}(0)), \operatorname{sgn}(s_{B_1}(6))] = [4.1188, 4.1316, [-1 -1 -1 1 -1 1 1 1 1 1], [-1 -1 1 1 -1 -1 -1 1 1 1]]$$

$$[a_2, a_3, \operatorname{sgn}(s_{B_2}(0)), \operatorname{sgn}(s_{B_2}(6))] = [4.1316, 4.1444, [-1 -1 -1 1 -1 1 1 1 1 1], [-1 -1 1 1 -1 -1 -1 1 1 1]]$$

$$[a_3, a_4, \operatorname{sgn}(s_{B_3}(0)), \operatorname{sgn}(s_{B_3}(6))] = [4.1444, 4.1572, [-1 -1 -1 1 -1 1 1 1 1 1], [-1 -1 1 1 -1 -1 -1 1 1 1]]$$

$$[a_4, a_5, \operatorname{sgn}(s_{B_4}(0)), \operatorname{sgn}(s_{B_4}(6))] = [4.1572, 4.1700, [-1 -1 -1 1 -1 1 1 1 1 1], [-1 -1 1 1 -1 -1 -1 1 1 1]]$$

(1)

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