

> *# Set the parameters and functions*

$a := 'a':$

$b := 'b':$

$u := 'u':$

$P := \left[\frac{4106}{1000}, \frac{4128}{1000}, \frac{4145}{1000}, \frac{4156}{1000}, \frac{4164}{1000}, \frac{417}{100} \right]:$

$V := (-80 - 5b^2 - 40b)u^6 + (-480b + 90a^3 + 15a^4)u^5 + (-1200b^2 + 20a^5 - 344b^3 - 27b^4)u^4 + (74a^6 - 1088b^4 + 60a^5 - 1600b^3)u^3 + (197a^6 - 984b^5 + 20a^7 - 1200b^4)u^2 + (-480b^5 + 15a^8 + 10a^7 - 320b^6)u - 80b^6 - 5b^8 - 40b^7:$

print(Output) :

Find Sturm's sequence

with(ArrayTools) :

for j from 1 by 1 to Size(P, 2) - 1 do

$a := P[j + 1];$

$b := P[j];$

$u := 'u':$

$S := \text{sturmseq}(V, u);$

with(ArrayTools) :

$\text{Slength} := \text{Size}(S, 2);$

$X := \text{Array}(1 .. \text{Slength});$

$Y := \text{Array}(1 .. \text{Slength});$

for i from 1 to Slength do

Find sign $[s_{K[i]}(4.1)]$

$u := 0;$

$X[i] := \text{signum}(S[i]);$

Find sign $[s_{K[i]}(6)]$

$u := 5:$

$Y[i] := \text{signum}(S[i]);$

end do;

show the final results

print($['a'[z - 1], 'a'[z], \text{sgn}(s['V '[z - 1]](0)), \text{sgn}(s['V '[z - 1]](6))] = [\text{evalf}(b, 4), \text{evalf}(a, 4), X, Y]$) :

end do;

Output

$[a_5, a_6, \text{sgn}(s_{V_5}(0)), \text{sgn}(s_{V_5}(6))] = [4.106, 4.128, [-1 \ -1 \ 1 \ -1 \ 1 \ 1 \ -1], [-1 \ 1 \ 1 \ -1 \ 1 \ 1 \ -1]]$

