

> *# 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 $sgn[s_{B_i}'(0)]$

$u := 0;$

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

Find $sgn[s_{B_i}'(6)]$

$u := 6;$

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

end do;

show the final results

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

end do;

Output

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

