

> *# Set the parameters and functions*

$t := 't':$

$s := 's':$

$u := 'u':$

$$\begin{aligned} V2 := & (2t^{16} + 4t^{14} - 4s^{12} - 12s^{10} + 12t^6 + 4t^4 - 4s^2 - 2) \cdot u^6 \\ & + (20t^{14} + 20t^{12} - 60s^{10} - 60s^8 + 60t^6 + 60t^4 - 20s^2 - 20) \cdot u^5 \\ & + (55t^{12} - 50s^{10} - 215s^8 + 100t^6 + 265t^4 - 50s^2 - 105) \cdot u^4 \\ & + (-40s^{10} - 360s^8 + 80t^6 + 720t^4 - 40s^2 - 360) \cdot u^3 + (-740s^8 \\ & - 920s^6 + 1200t^4 + 920t^2 - 460) \cdot u^2 + (-1636s^6 \\ & - 292s^4 + 36 + 1892t^2) \cdot u + 1550t^2 - 625s^4 + 575 : \end{aligned}$$

print Output ;

find Sturm's sequence

for j from 0 by 1 to 4 do

$t := \frac{j}{5} :$

$s := \frac{j+1}{5} :$

$u := 'u':$

$S := \text{sturmseq}(V2, u);$

$\text{signnum} := \text{sturm}\left(S, u, 0, \left(\frac{75}{100}\right)^2\right);$

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

$u := 0;$

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

$$u := \left(\frac{75}{100} \right)^2 :$$

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

show the final results

$\text{print} \left(\left[\left[t'[j], t'[j+1], \text{sgn}(s[V[2, j](0)]) \right], \text{sgn} \left(s \left[\left[V[2, j] \left(\left[\frac{75}{100} \right]^2 \right) \right] \right) \right] \right] = [t, s, X, Y] \right);$

end do;

print Output

$$\begin{aligned} & \left[t_0, t_1, \text{sgn}(s_{V_{2,0}(0)}), \text{sgn} \left(s_{V_{2,0} \left(\left(\left[\frac{3}{4} \right]^2 \right) \right)} \right) \right] = \left[0, \frac{1}{5}, \begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix}, \begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 1 & -1 \end{bmatrix} \right] \\ & \left[t_1, t_2, \text{sgn}(s_{V_{2,1}(0)}), \text{sgn} \left(s_{V_{2,1} \left(\left(\left[\frac{3}{4} \right]^2 \right) \right)} \right) \right] = \left[\frac{1}{5}, \frac{2}{5}, \begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix}, \begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 1 & -1 \end{bmatrix} \right] \\ & \left[t_2, t_3, \text{sgn}(s_{V_{2,2}(0)}), \text{sgn} \left(s_{V_{2,2} \left(\left(\left[\frac{3}{4} \right]^2 \right) \right)} \right) \right] = \left[\frac{2}{5}, \frac{3}{5}, \begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix}, \begin{bmatrix} 1 & -1 & -1 & 1 & 1 & 1 & -1 \end{bmatrix} \right] \\ & \left[t_3, t_4, \text{sgn}(s_{V_{2,3}(0)}), \text{sgn} \left(s_{V_{2,3} \left(\left(\left[\frac{3}{4} \right]^2 \right) \right)} \right) \right] = \left[\frac{3}{5}, \frac{4}{5}, \begin{bmatrix} 1 & 1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix}, \begin{bmatrix} 1 & -1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix} \right] \\ & \left[t_4, t_5, \text{sgn}(s_{V_{2,4}(0)}), \text{sgn} \left(s_{V_{2,4} \left(\left(\left[\frac{3}{4} \right]^2 \right) \right)} \right) \right] = \left[\frac{4}{5}, 1, \begin{bmatrix} 1 & -1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix}, \begin{bmatrix} 1 & -1 & -1 & -1 & 1 & 1 & -1 \end{bmatrix} \right] \end{aligned}$$

(1)

