file: c:\mcad\rwn\vanderpolf.mcd RWN 10/22/01

mathcad file to check piecewise linear equation for van der Pol oscillator

$$a := 0 \qquad b := \frac{1}{\left(\sqrt{3}\right) - 1} \qquad c := \frac{-\left(\sqrt{3}\right)}{2\left[\left(\sqrt{3}\right) - 1\right]} \qquad d := -c$$

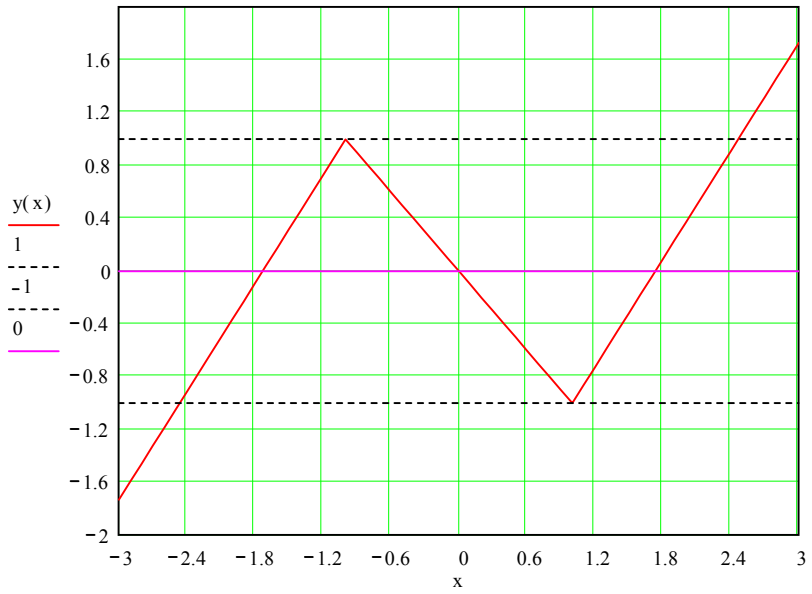
$$y(x) := a + b \cdot x + c \cdot |x + 1| + d \cdot |x - 1|$$

according to the matrix equation at the end of the page, a, b, c, d, are determined by evaluation at:

$$y\left(\sqrt{3}\right) = 0 \qquad y\left(-\sqrt{3}\right) = 0 \qquad y(0) = 0 \qquad x := 0 \qquad \frac{d}{dx} y(x) = -1$$

$$xend := 3$$

$$x := -xend, -xend + 0.1 .. xend$$



$$A := \begin{bmatrix} 0 & 1 & 1 & -1 \\ 1 & -\sqrt{3} & -1+\sqrt{3} & 1+\sqrt{3} \\ 1 & \sqrt{3} & 1+\sqrt{3} & -1+\sqrt{3} \\ 1 & 0 & 1 & 1 \end{bmatrix}$$

$$x := \begin{bmatrix} -1 \\ 0 \\ 0 \\ 0 \end{bmatrix} \qquad y := A^{-1} \cdot x \qquad y = \begin{bmatrix} 0 \\ 1.366 \\ -1.183 \\ 1.183 \end{bmatrix} \qquad ycomp := \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} \qquad ycomp = \begin{bmatrix} 0 \\ 1.366 \\ -1.183 \\ 1.183 \end{bmatrix}$$