Bresenham Algorithm

Plot function

Examples

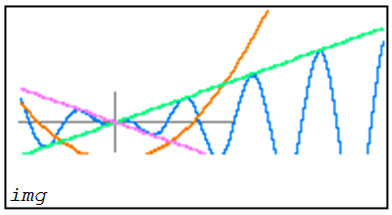
Define the plot range, the size of the plot window and the offstet in pixeles, the thikness of the plot trace and the percent for axes:

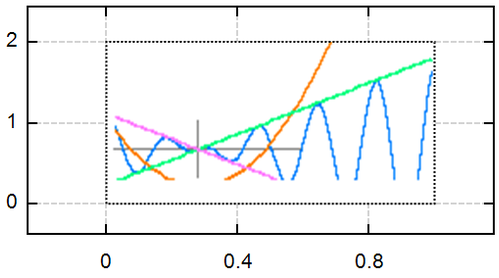
$$Box := \begin{bmatrix} -2 & 5 & 200 & 6 & 1 & 30\,\% \\ -3 & 6 & 100 & 12 & 1 & 15\,\% \end{bmatrix} \qquad \begin{bmatrix} x_{min} & x_{max} & px & ox & tx & ax \\ y_{min} & y_{max} & py & oy & ty & ay \end{bmatrix} := Box \qquad N := 100$$

Functions to plot:

$$X := \left[x_{min}, x_{min} + \frac{x_{max} - x_{min}}{N-1} .. x_{max} \right] \qquad Y := \begin{bmatrix} \overrightarrow{X \cdot \cos(5 \cdot X)} \\ \overrightarrow{X^2 - 2} \\ X \\ -X \end{bmatrix}$$

$$\begin{bmatrix} img := pBres(X, Y, Box) \\ IMG := \begin{bmatrix} \begin{bmatrix} "image:\{img\}" \\ \begin{bmatrix} 0 \\ 0 \\ 0.01 \cdot py \\ 0.01 \cdot px \end{bmatrix} \\ "black" \\ "dot" \\ 1 \end{bmatrix} \end{bmatrix} \end{bmatrix}$$





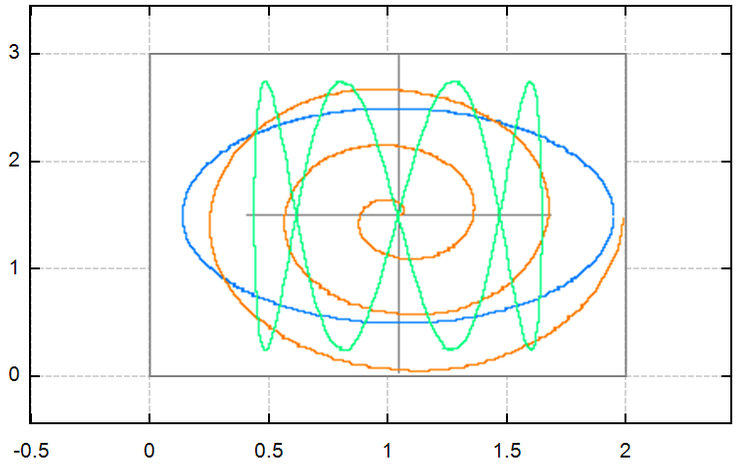
[IMG]

Parametric equations

$$B := \begin{bmatrix} -3.5 & 3.5 & 300 & 2 & 1 & 30\,\% \\ -3 & 3 & 200 & 2 & 1 & 60\,\% \end{bmatrix} \qquad N := 200 \qquad T := \left[0, \frac{2 \cdot \pi}{N-1} .. (2 \cdot \pi) \right]$$

$$X := \begin{bmatrix} \overrightarrow{3 \cdot \cos(T)} \\ \overrightarrow{0.5 \cdot T \cdot \cos(3 \cdot T)} \\ \overrightarrow{2 \cdot \sin(T)} \end{bmatrix} \qquad Y := \begin{bmatrix} \overrightarrow{2 \cdot \sin(T)} \\ \overrightarrow{0.5 \cdot T \cdot \sin(3 \cdot T)} \\ \overrightarrow{2.5 \cdot \sin(4 \cdot T)} \end{bmatrix}$$

$$\begin{bmatrix} img := pBres(X, Y, B) \\ IMG := \begin{bmatrix} \begin{bmatrix} "image:\{img\}" \\ \begin{bmatrix} 0 \\ 0 \\ 0.01 \cdot B_{2\,3} \\ 0.01 \cdot B_{1\,3} \end{bmatrix} \\ "gray" \\ "lines" \\ 1 \end{bmatrix} \end{bmatrix} \end{bmatrix}$$



[IMG]

Array of plots

$$\begin{bmatrix} m := 2 \\ n := 3 \end{bmatrix} \qquad B := \begin{bmatrix} -2 & 10 & 400 & 0 & 1 & 0\,\% \\ -2 & 6 & 200 & 0 & 1 & 0\,\% \end{bmatrix} \qquad N := 100 \qquad T := \left[0, \frac{2 \cdot \pi}{N-1} .. (2 \cdot \pi) \right]$$

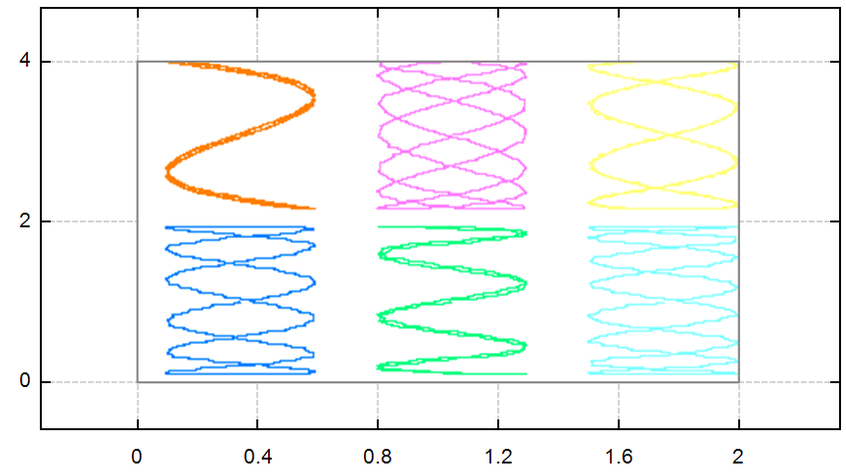
$$f(r, c) := \left[\overrightarrow{1.4 \cdot \sin((c+5) \cdot T)} + 4 \cdot (c-1) \; \overrightarrow{1.8 \cdot \sin(r \cdot T)} + 4 \cdot (r-1) \right]$$

$$\begin{bmatrix} X := 0 \end{bmatrix} \quad \text{for } r \in [1..m]$$

$$\left[{}^{X}{}_{r+m\cdot(c-1)}\ {}^{Y}{}_{r+m\cdot(c-1)}\right] := \mathrm{eval}\left(f(r,c)\right)$$

$$img := pBres(X, Y, B)$$

$$IMG := \left[\left[\begin{array}{c} \text{"image:\{img\}"} \\ \begin{bmatrix} 0 \\ 0 \\ 0.01\cdot B_{2\,3} \\ 0.01\cdot B_{1\,3} \end{bmatrix} \\ \text{"gray"} \\ \text{"lines"} \\ 1 \end{array}\right]\right]$$



[IMG]

Polygons

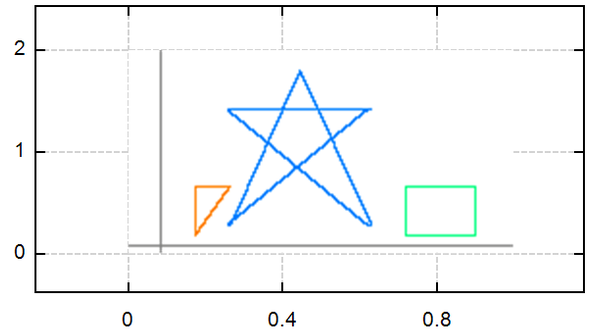
$$X := \left[\left[2\ 6\ 2\ 4\ 6\ 2\right]\left[1\ 2\ 1\ 1\right]\left[7\ 9\ 9\ 7\ 7\right]\right]$$

$$Y := \left[\left[14\ 14\ 2\ 18\ 2\ 14\right]\left[6\ 6\ 1\ 6\right]\left[6\ 6\ 1\ 1\ 6\right]\right]$$

$$B := \begin{bmatrix} -1 & 10 & 200 & 0 & 1 & 100 & \% \\ -1 & 20 & 100 & 0 & 1 & 100 & \% \end{bmatrix}$$

$$img := pBres(X, Y, B)$$

$$IMG := \left[\left[\begin{array}{c} \text{"image:\{img\}"} \\ \begin{bmatrix} 0 \\ 0 \\ 1 \\ 2 \end{bmatrix} \\ \text{"transparent"} \\ \text{""} \\ 1 \end{array}\right]\right]$$



[IMG]

Alvaro

$$\mathrm{appVersion}(4) = \text{"1.73.9126.0"}$$