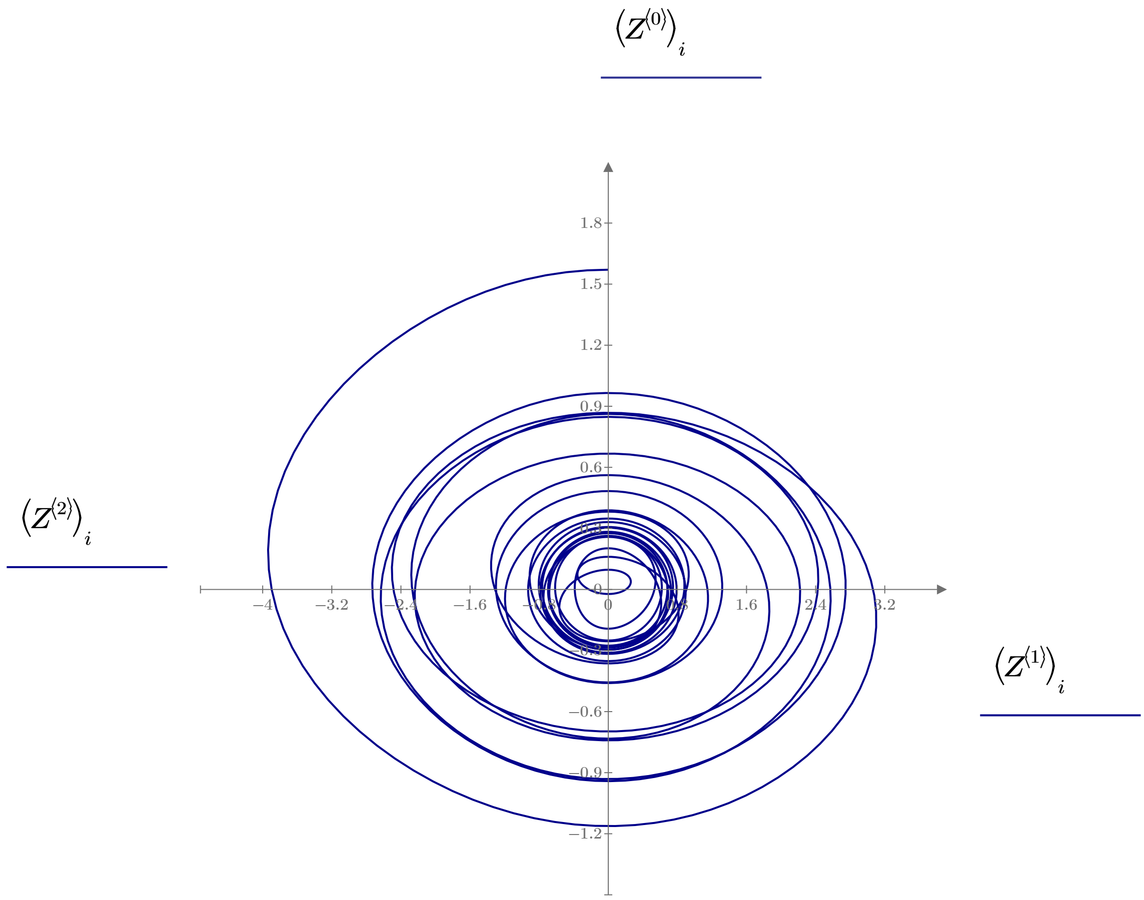
$m := 1$

$l := 1$ $\quad v_0 := 2 \cdot \sqrt{g \cdot l}$ $\quad \varphi_0 := \dfrac{\pi}{2}$ $\quad g := 9.80665$ $\quad a := l$ $\quad k := 0.5$ $\quad v_0 := 0$ $\quad y := \begin{bmatrix} v_0 \\ \varphi_0 \end{bmatrix}$ $\quad w_0 := \sqrt{\dfrac{g}{l}}$

$$D(t, y) := \begin{bmatrix} -w_0^{\,2} \cdot y_1 \cdot 0 - 1 \cdot w_0^{\,2} \cdot \sin\left(y_1\right) - k \cdot y_0 + a \cdot \sin\left(w_1 \cdot t\right) \\ y_0 \end{bmatrix}$$

$Z := \mathrm{rkfixed}\left(y, 0, 49.9, 2000, D\right)$ $\quad Z =$



$$A := \frac{1}{\sqrt{\left(w_0{}^2 - w^2\right)^2 + 4\left(\delta^2 \cdot w^2\right)}} = \begin{bmatrix} 0.102 \\ 0.102 \\ \vdots \end{bmatrix}$$

$$\varphi := \operatorname{atan}\left(\frac{2 \cdot \delta \cdot w}{w_0{}^2 - w^2}\right) = \begin{bmatrix} 0 \\ 4.885 \cdot 10^{-4} \\ \vdots \end{bmatrix}$$

$g := 9.80665$

$v_0 := 2 \cdot \sqrt{g \cdot l}$ $\quad \varphi_0 := 0$ $\quad a := l$ $\quad k := 0.2$ $\quad v_0 := \frac{\pi}{2}$ $\quad y := \begin{bmatrix} v_0 \\ \varphi_0 \end{bmatrix}$ $\quad w_0 := \sqrt{\frac{g}{l}}$

$$\begin{array}{l}
w0 \leftarrow \sqrt{\frac{g}{l}} \\
h \leftarrow 0.025 \\
d \leftarrow 0.1 \\
w \leftarrow w0 \cdot 0.1 \\
v \leftarrow \frac{\pi}{24} \\
phi \leftarrow 0 \\
i \leftarrow 0 \\
m \leftarrow l \cdot \sin(phi) \\
\text{while } i < n \\
\quad t \leftarrow h \cdot \left(a \cdot \sin(w \cdot i \cdot h) - w0^2 \cdot \sin(phi)\right) \\
\quad phi \leftarrow phi + h \cdot v \\
\quad v \leftarrow v + t \\
\quad i \leftarrow i + 1 \\
\quad \text{if } (l \cdot \sin(phi) > m) \\
\quad\quad m \leftarrow l \cdot \sin(phi) \\
m
\end{array} = 1$$

$$R(t,y) := \begin{bmatrix} \frac{-g}{l} \cdot y_1 \cdot 0 - 1 \cdot w_0 \cdot \sin\left(y_1\right) - k \cdot y_0 + a \cdot \sin(w \\ y_0 \end{bmatrix}$$

$$\left(A^{\langle i \rangle}\right)_j := \frac{A0}{m \cdot \sqrt{\left(w0^2 - w_j{}^2\right)^2 + 4\ b_i{}^2 \cdot w_j{}^2}}$$

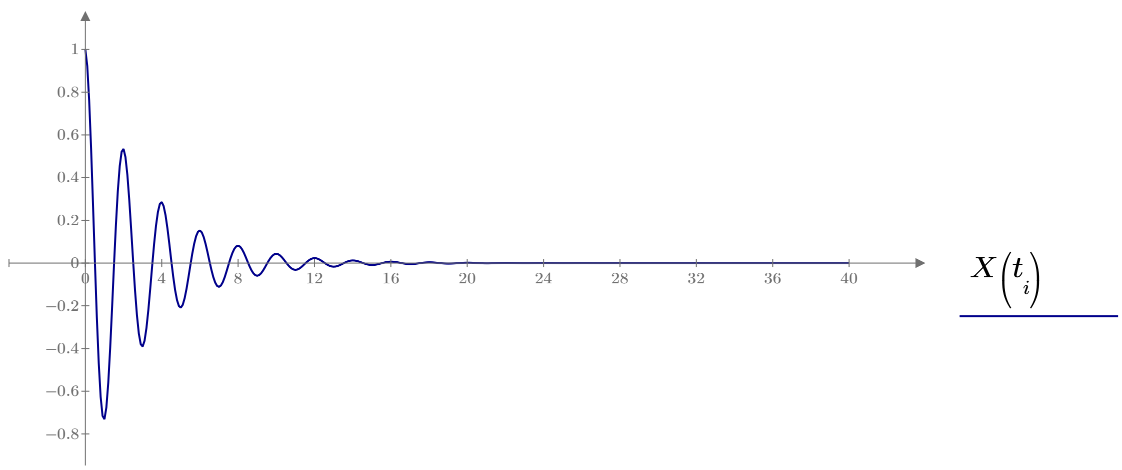
$$t := 0, 0.1 .. 40 = \begin{bmatrix} 0 \\ \vdots \end{bmatrix}$$

$m := 1$

$l := 1$

$d := 0.1$ $\quad w0 := \sqrt{\frac{g}{l}}$ $\quad w := w0$ $\quad f := 0$

$A0 := l$ $\quad b := d \cdot w0$ $\quad X(t) := A0 \cdot e^{-b \cdot t} \cdot \cos(w \cdot t + f)$



t_i

$n := 1000$

$m := 3 \qquad step := \frac{m}{n} = 0.003 \qquad k1 := 0, s$

$k := 0, step..m = \begin{bmatrix} 0 \\ 0.003 \\ 0.006 \\ \vdots \end{bmatrix}$

$w1 :=$

$z(t) := 3 \cdot \frac{t}{m} \qquad z(k) = \begin{bmatrix} 0 \\ 0.003 \\ 0.006 \\ \vdots \end{bmatrix}$

$d1 :=$

$w := w0 \cdot k = \begin{bmatrix} 0 \\ 0.009 \\ 0.019 \\ \vdots \end{bmatrix}$

$b1$

$d := 0, 0.01..10 = \begin{bmatrix} 0 \\ \vdots \end{bmatrix}$

$b := w0 \cdot d$

$$A_1 := \left\| \begin{array}{l} j \leftarrow 0 \\ \text{while } j \le 320 \\ \quad \left\| \begin{array}{l} (A)_j \leftarrow \dfrac{A0}{m \cdot \sqrt{\left(w0^2 - {w1_j}^2\right)^2 + 4\ {b1_0}^2 \cdot {w1_j}^2}} \\ j \leftarrow j+1 \end{array} \right. \\ A \end{array} \right.$$

$$A_2 := \left\| \begin{array}{l} j \leftarrow 0 \\ \text{while } j \le n \\ \quad \left\| \begin{array}{l} (A)_j \leftarrow \dfrac{A0}{m \cdot \sqrt{\left(w0^2 - {w2_j}^2\right)^2 + 4\ {b2_0}^2 \cdot {w2_j}^2}} \\ j \leftarrow j+1 \end{array} \right. \\ A \end{array} \right.$$

$$A_5 := \left\| \begin{array}{l} j \leftarrow 0 \\ \text{while } j \le n \\ \quad \left\| \begin{array}{l} (A)_j \leftarrow \dfrac{A0}{m \cdot \sqrt{\left(w0^2 - {w_j}^2\right)^2 + 4\ {b_{15}}^2 \cdot {w_j}^2}} \\ j \leftarrow j+1 \end{array} \right. \\ A \end{array} \right.$$

$$A_6 := \left\| \begin{array}{l} j \leftarrow 0 \\ \text{while } j \le n \\ \quad \left\| \begin{array}{l} (A)_j \leftarrow \dfrac{A0}{m \cdot \sqrt{\left(w0^2 - {w_j}^2\right)^2 + 4\ {b_{20}}^2 \cdot {w_j}^2}} \\ j \leftarrow j+1 \end{array} \right. \\ A \end{array} \right.$$

$$A_9 := \left\| \begin{array}{l} j \leftarrow 0 \\ \text{while } j \le n \\ \quad \left\| \begin{array}{l} (A)_j \leftarrow \dfrac{A0}{m \cdot \sqrt{\left(w0^2 - {w_j}^2\right)^2 + 4\ {b_{50}}^2 \cdot {w_j}^2}} \\ j \leftarrow j+1 \end{array} \right. \end{array} \right.$$

$$A_{10} := \left\| \begin{array}{l} j \leftarrow 0 \\ \text{while } j \le n \\ \quad \left\| \begin{array}{l} (A)_j \leftarrow \dfrac{A0}{m \cdot \sqrt{\left(w0^2 - {w_j}^2\right)^2 + 4\ {b_{100}}^2 \cdot {w_j}^2}} \\ j \leftarrow j+1 \end{array} \right. \end{array} \right.$$

$j \leftarrow j+1$
A

$j \leftarrow j+1$
A