Einfaldur pendúll:

$g = 9.81\, m/s^2$ $\quad \theta(0), \dot{\theta}(0)$ eru gefin

g.r.f. að $\sin(\theta) \simeq \theta$ f. lítil horn

1. $$\frac{d^2\theta}{dt^2} + \frac{g}{L}\sin(\theta) = 0 \Rightarrow \ddot{\theta} + \frac{g}{L}\sin(\theta) = 0$$

$$\bar{\theta} = \begin{pmatrix} \theta \\ \dot{\theta} \end{pmatrix} \qquad \bar{\theta}' = \begin{pmatrix} \dot{\theta} \\ \ddot{\theta} \end{pmatrix}$$

$$\ddot{\theta} + \frac{g}{L}\cdot\sin(\theta) = 0 \Rightarrow \theta = \sin^{-1}\left(\frac{-\ddot{\theta}}{g}\cdot L\right)$$

$$\Rightarrow \ddot{\theta} = -\frac{g}{L}\cdot\sin(\theta)$$

$$F(t, \bar{\theta}) = \begin{pmatrix} \theta \\ \ddot{\theta} \end{pmatrix} = \begin{pmatrix} \dot{\theta}(t) \\ -\frac{g}{L}\cdot\sin(\theta) \end{pmatrix} \Rightarrow \mathbb{R}^2 = z$$

$$z_1 = \theta(1)$$

$$z_2 = -\frac{g}{2}\cdot\sin(\theta(0))$$

$$\bar{\Theta}(t) = \bar{\Theta}(t-1) + h\bar{f}(t-1, \theta)$$

$$\begin{pmatrix} \Theta(t) \\ \dot{\Theta}(t) \end{pmatrix} = \begin{pmatrix} \Theta(t-1) \\ \dot{\theta}(t-1) \end{pmatrix} + h \begin{pmatrix} \dot{\theta}(t-1) \\ (-g/L) \cdot \sin(\theta(t-1)) \end{pmatrix}$$