Model

$x_t = Ax_{t-1} + Vu_t + b + w_t$

$y_t = Cx_t + Fu_t + d + v_t$

$w_t \sim \mathcal{N}(0, \Sigma_w)$

$v_t \sim \mathcal{N}(0, \Sigma_v)$

Constraints

C is the identity

F is the 0 matrix

V, Σ_w, Σ_v are diagonal

Need to handle missing data

Train on data sets of different lengths

May condition on multiple past timepoints

Innefficient, but easy to code like this

$$\begin{bmatrix} x_t \\ x_{t-1} \end{bmatrix} = \begin{bmatrix} A & H \\ I & A \end{bmatrix} \begin{bmatrix} x_{t-1} \\ x_{t-2} \end{bmatrix} + Vu_t + b + w_t$$