Initial latent state:

$$\underbrace{\begin{bmatrix}\text{eta1}\\ \text{eta2}\end{bmatrix}(t_0)}_{\boldsymbol{\eta}(t_0)} \sim \mathrm{N}\left(\underbrace{\begin{bmatrix}\text{T0m\_eta1}\\ \text{T0m\_eta2}\end{bmatrix}}_{\underbrace{}_{\text{T0MEANS}}}, \underbrace{UcorSDtoCov\left\{\begin{bmatrix}\text{T0var\_eta1} & 0\\ \text{T0var\_eta2\_eta1} & \text{T0var\_eta2}\end{bmatrix}\right\}}_{\underbrace{\mathbf{Q^*}_{t0}}_{\text{T0VAR}}}\right)$$

Deterministic change:

$$\underbrace{\mathrm{d}\begin{bmatrix}\text{eta1}\\ \text{eta2}\end{bmatrix}(t)}_{\mathrm{d}\boldsymbol{\eta}(t)} = \left(\underbrace{\begin{bmatrix}-1 & 0\\ 0.5 & -1\end{bmatrix}}_{\underbrace{\mathbf{A}}_{\text{DRIFT}}}\underbrace{\begin{bmatrix}\text{eta1}\\ \text{eta2}\end{bmatrix}(t)}_{\boldsymbol{\eta}(t)} + \underbrace{\begin{bmatrix}0\\ 0\end{bmatrix}}_{\underbrace{\mathbf{b}}_{\text{CINT}}}\right)\mathrm{d}t \quad +$$

Random change:

$$\underbrace{UcorSDtoChol\left\{\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}\right\}}_{\underbrace{\mathbf{G}}_{\text{DIFFUSION}}}\underbrace{\mathrm{d}\begin{bmatrix}W_1\\ W_2\end{bmatrix}(t)}_{\mathrm{d}\mathbf{W}(t)}$$

Observations:

$$\underbrace{\begin{bmatrix}\text{Y1}\\ \text{Y2}\end{bmatrix}(t)}_{\mathbf{Y}(t)} = \underbrace{\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}}_{\underbrace{\boldsymbol{\Lambda}}_{\text{LAMBDA}}}\underbrace{\begin{bmatrix}\text{eta1}\\ \text{eta2}\end{bmatrix}(t)}_{\boldsymbol{\eta}(t)} + \underbrace{\begin{bmatrix}\text{mm\_Y1}\\ \text{mm\_Y2}\end{bmatrix}}_{\underbrace{\boldsymbol{\tau}}_{\text{MANIFESTMEANS}}} \quad +$$

Observation noise:

$$\underbrace{\begin{bmatrix}\text{mvarY1} & 0\\ 0 & \text{mvarY2}\end{bmatrix}}_{\underbrace{\boldsymbol{\Theta}}_{\text{MANIFESTVAR}}}\underbrace{\begin{bmatrix}\epsilon_1\\ \epsilon_2\end{bmatrix}(t)}_{\boldsymbol{\epsilon}(t)}$$

System noise distribution per time step: $\Delta\left[W_{j\in[1,2]}\right](t-u) \sim \mathrm{N}(0, t-u)$

Observation noise distribution: $\left[\epsilon_{j\in[1,2]}\right](t) \sim \mathrm{N}(0,1)$

Note: *UcorSDtoChol* converts lower tri matrix of standard deviations and unconstrained correlations to Cholesky factor, *UcorSDtoCov* = transposed cross product of UcorSDtoChol, to give covariance, See Driver & Voelkle (2018) p11.