

Subject parameter distribution: $\underbrace{\begin{bmatrix} \text{T0m_eta1}_i \\ \text{slope}_i \end{bmatrix}}_{\phi(i)} \sim \text{tform} \left\{ \text{N} \left(\begin{bmatrix} \text{raw_T0m_eta1} \\ \text{raw_slope} \end{bmatrix}, \begin{bmatrix} \text{raw_PCov_1.1} & \text{raw_PCov_2.1} \\ \text{raw_PCov_2.1} & \text{raw_PCov_2.2} \end{bmatrix} \right) \right\}$

Initial latent states: $\underbrace{\begin{bmatrix} \text{eta1} \end{bmatrix} (t_0)}_{\eta(t_0)} \sim \text{N} \left(\underbrace{\begin{bmatrix} \text{T0m_eta1} \end{bmatrix}}_{\text{T0MEANS}}, \underbrace{\text{covsdcor} \{ \begin{bmatrix} \text{Pcorsqrt_1_1} \end{bmatrix} \}}_{\underbrace{\mathbf{Q}^*_{t0}}_{\text{T0VAR}}} \right)$

Deterministic change: $\underbrace{\text{d} \begin{bmatrix} \text{eta1} \end{bmatrix} (t)}_{\text{d}\eta(t)} = \begin{pmatrix} \underbrace{\begin{bmatrix} 0 \end{bmatrix}}_{\underbrace{\mathbf{A}}_{\text{DRIFT}}} \underbrace{\begin{bmatrix} \text{eta1} \end{bmatrix} (t)}_{\eta(t)} + \underbrace{\begin{bmatrix} \text{slope} \end{bmatrix}}_{\underbrace{\mathbf{b}}_{\text{CINT}}} \end{pmatrix} dt +$

Random change: $\underbrace{\text{cholsdcor} \{ \begin{bmatrix} 0 \end{bmatrix} \}}_{\underbrace{\mathbf{G}}_{\text{DIFFUSION}}} \underbrace{\text{d} \begin{bmatrix} W_1 \end{bmatrix} (t)}_{\text{d}\mathbf{W}(t)}$

Observations: $\underbrace{\begin{bmatrix} y1 \end{bmatrix} (t)}_{\mathbf{Y}(t)} = \underbrace{\begin{bmatrix} 1 \end{bmatrix}}_{\underbrace{\mathbf{\Lambda}}_{\text{LAMBDA}}} \underbrace{\begin{bmatrix} \text{eta1} \end{bmatrix} (t)}_{\eta(t)} + \underbrace{\begin{bmatrix} 0 \end{bmatrix}}_{\underbrace{\boldsymbol{\tau}}_{\text{MANIFESTMEANS}}} + \underbrace{\begin{bmatrix} \text{errorsd_intercept} + \text{errorsd_byeta1} * \text{eta1} \end{bmatrix}}_{\underbrace{\boldsymbol{\Theta}}_{\text{MANIFESTVAR}}} \underbrace{\begin{bmatrix} \epsilon_1 \end{bmatrix} (t)}_{\epsilon(t)}$

Latent noise per time step : $\Delta \begin{bmatrix} W_{j \in [1,1]} \end{bmatrix} (t - u) \sim \text{N}(0, t - u)$ Observation noise: $\begin{bmatrix} \epsilon_{j \in [1,1]} \end{bmatrix} (t) \sim \text{N}(0, 1)$

cholsdcor converts lower tri matrix of std dev and unconstrained correlation to Cholesky factor covariance.
covsdcor = transposed cross product of *cholsdcor*, to give covariance.
 See Driver & Voelkle (2018) p11.