$$\text{Initial latent states: } \underbrace{\begin{bmatrix}\text{ss\_level}\\ \text{ss\_velocity}\end{bmatrix}(t_0)}_{\boldsymbol{\eta}(t_0)} \sim \mathrm{N}\left(\underbrace{\begin{bmatrix}\text{T0m\_ss\_level}\\ \text{T0m\_ss\_velocity}\end{bmatrix}}_{\text{T0MEANS}}, \underbrace{covsdcor\left\{\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}\right\}}_{\substack{\mathbf{Q}^*{}_{t0}\\ \text{T0VAR}}}\right)$$

$$\text{Deterministic change: } \underbrace{\mathrm{d}\begin{bmatrix}\text{ss\_level}\\ \text{ss\_velocity}\end{bmatrix}(t)}_{\mathrm{d}\boldsymbol{\eta}(t)} = \left(\underbrace{\begin{bmatrix}0 & 1\\ \text{a21} & \text{a22}\end{bmatrix}}_{\substack{\mathbf{A}\\ \text{DRIFT}}}\underbrace{\begin{bmatrix}\text{ss\_level}\\ \text{ss\_velocity}\end{bmatrix}(t)}_{\boldsymbol{\eta}(t)} + \underbrace{\begin{bmatrix}0\\ 0\end{bmatrix}}_{\substack{\mathbf{b}\\ \text{CINT}}}\right)\mathrm{d}t \quad +$$

$$\text{Random change: } \underbrace{cholsdcor\left\{\begin{bmatrix}0 & 0\\ 0 & \text{diffusion}\end{bmatrix}\right\}}_{\substack{\mathbf{G}\\ \text{DIFFUSION}}}\underbrace{\mathrm{d}\begin{bmatrix}W_1\\ W_2\end{bmatrix}(t)}_{\mathrm{d}\mathbf{W}(t)}$$

$$\text{Observations: } \underbrace{[\text{sunspots}](t)}_{\mathbf{Y}(t)} = \underbrace{\begin{bmatrix}1 & 0\end{bmatrix}}_{\substack{\boldsymbol{\Lambda}\\ \text{LAMBDA}}}\underbrace{\begin{bmatrix}\text{ss\_level}\\ \text{ss\_velocity}\end{bmatrix}(t)}_{\boldsymbol{\eta}(t)} + \underbrace{[\text{m1}]}_{\substack{\boldsymbol{\tau}\\ \text{MANIFESTMEANS}}} + \underbrace{[0]}_{\substack{\boldsymbol{\Theta}\\ \text{MANIFESTVAR}}}\underbrace{[\epsilon_1](t)}_{\boldsymbol{\epsilon}(t)}$$

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

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.