1 Julia Output 2021-01-04

To check the covariance matrix generator function, I printed out the "Latexified" symbolic matrix generated in Julia using $N = 2, T = 3$.

LEFT HALF OF COVARIANCE MATRIX

$$\begin{bmatrix} \sigma_u^2\left(1.0+\frac{\rho^2}{2-2\rho}\right)+\frac{\sigma_a^2}{1-\rho^2} & \frac{\sigma_a^2}{1-\rho^2}+\frac{\sigma_u^2\rho^2}{2-2\rho} & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) \\ \frac{\sigma_a^2}{1-\rho^2}+\frac{\sigma_u^2\rho^2}{2-2\rho} & \sigma_u^2\left(1.0+\frac{\rho^2}{2-2\rho}\right)+\frac{\sigma_a^2}{1-\rho^2} & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) \\ \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \sigma_u^2\left(1.0+\frac{\rho^2}{2-2\rho}\right)+\frac{\sigma_a^2}{1-\rho^2} \\ \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \frac{\sigma_a^2}{1-\rho^2}+\frac{\sigma_u^2\rho^2}{2-2\rho} \\ \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} & \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) \\ \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} & \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) \end{bmatrix} \tag{1}$$

RIGHT HALF OF COVARIANCE MATRIX

$$\begin{bmatrix} \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} & \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} \\ \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} & \sigma_u^2\left(\frac{1}{2}\rho^2+\frac{\rho^4}{2-2\rho}\right)+\frac{\sigma_a^2\rho^2}{1-\rho^2} \\ \frac{\sigma_a^2}{1-\rho^2}+\frac{\sigma_u^2\rho^2}{2-2\rho} & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) \\ \sigma_u^2\left(1.0+\frac{\rho^2}{2-2\rho}\right)+\frac{\sigma_a^2}{1-\rho^2} & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) \\ \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \sigma_u^2\left(1.0+\frac{\rho^2}{2-2\rho}\right)+\frac{\sigma_a^2}{1-\rho^2} & \frac{\sigma_a^2}{1-\rho^2}+\frac{\sigma_u^2\rho^2}{2-2\rho} \\ \frac{\sigma_a^2\rho}{1-\rho^2}+\sigma_u^2\left(\frac{1}{2}\rho+\frac{\rho^3}{2-2\rho}\right) & \frac{\sigma_a^2}{1-\rho^2}+\frac{\sigma_u^2\rho^2}{2-2\rho} & \sigma_u^2\left(1.0+\frac{\rho^2}{2-2\rho}\right)+\frac{\sigma_a^2}{1-\rho^2} \end{bmatrix} \tag{2}$$

Upon inspection with the 2021-12 note, this output matches the form of the covariance matrix given for the $N = 2, T = 3$ example.