11.2 More On

Wednesday, February 3, 2021 8:54 PM

$$Y_t = \alpha + Y_{t-1} + \varepsilon_t$$

↳ drift

Y_0

$Y_1 = \alpha + Y_0 + \varepsilon_1$

$Y_2 = 2\alpha + Y_0 + \varepsilon_1 + \varepsilon_2$

$Y_3 = 3\alpha + Y_0 + \varepsilon_1 + \varepsilon_2 + \varepsilon_3$

$Y_t = t\alpha + Y_0 + \text{sum}(j=1:t \mid \varepsilon_j)$

↳ time trend

$\Delta Y_t = Y_t - Y_{t-1} = \alpha t + Y_0 + \varepsilon_t + \varepsilon_{t-1} + \ldots - (\alpha(t-1) + Y_0 + \varepsilon_{t-1} + \varepsilon_{t-2} \ldots)$

$E(\Delta Y_t) = \alpha \qquad \text{Var}(\Delta Y_t) = \sigma^2$

$$Y_t = \alpha t + Y_0 + \sum_{i=1}^{t} \varepsilon_i$$

$E(Y_t) = Y_0 + \alpha t$

$\text{Var}(Y_t) = \sigma_1^2 + \sigma_2^2 + \ldots \sigma_t^2 = t\sigma^2$

$\text{Stdev}(Y_t) = \sqrt{t} \cdot \sigma$