The effects of shock on the adjustment path: Autoregressive Process (Mathematical Structure)

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Note : 3

$$y_t = \boldsymbol{\rho y_{t-k}} + v$$

$$v \sim N(0, \sigma_v^2)$$

$$f^1(t) = \left\{ y_t \in \mathbb{R} \mid (y_t \to \boldsymbol{y_{t-k}}) \mapsto \left(y_t \longrightarrow (\boldsymbol{\rho})^t \times v \right) \; where \; (t, \rho, v, k) \in \mathbb{R} \,\&\, t \longrightarrow \infty, t > k \right\}$$

$$y_t = \boldsymbol{\gamma e_{t-k}} + \zeta$$

$$\zeta \sim N(0, \sigma_\zeta^2)$$

$$f^2(t) = \left\{ y_t \in \mathbb{R} \mid (y_t \to \boldsymbol{e_{t-k}}) \mapsto \left(y_t \longrightarrow (\boldsymbol{\gamma})^t \times v \right) \; where \; (t, \gamma, v, k) \in \mathbb{R} \,\&\, t \longrightarrow \infty, t > k \right\}$$

$$y_t = \boldsymbol{\delta \sigma_{t-k}} + \eta$$

$$\eta \sim N(0, \sigma_\eta^2)$$

$$or,$$

$$\eta \sim G(0, \sigma_\eta^2)$$

$$or,$$

$$\eta \sim NG(0, \sigma_\eta^2)$$

$$f^3(t) = \left\{ y_t \in \mathbb{R} \mid (y_t \to \boldsymbol{\sigma_{t-k}}) \mapsto \left(y_t \longrightarrow (\boldsymbol{\delta})^t \times \sigma_t \times v \right) \; where \; (t, \delta, v, k) \in \mathbb{R} \,\&\, t \longrightarrow \infty, t > k \right\}$$

References

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