VAR

VAR(p)

$$y_t = \mu + B_1 y_{t-1} + \dots + B_p y_{t-p} + \nu_t$$

VMA(∞)

$$\underbrace{\nu_t}_{} = \Omega^{-1/2} \underbrace{\varepsilon_t}_{\text{orthogonal}} \quad \varepsilon_t \sim N(0, I)$$

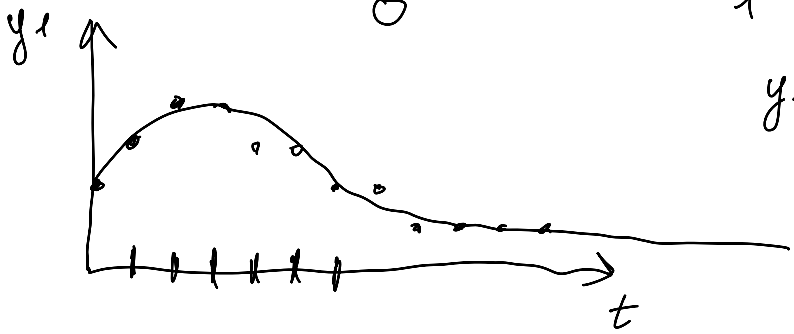
$$y_t = \tilde{\mu} + \boxed{C_0} \nu_t + C_1 \nu_{t-1} + C_2 \nu_{t-2} + \dots$$

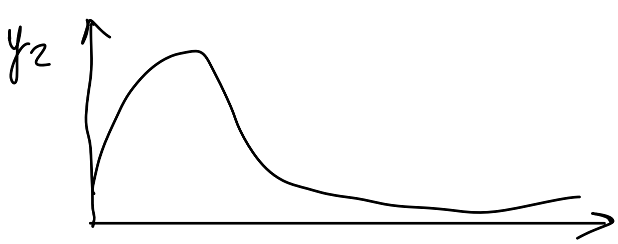
$$\nu_t = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \begin{array}{c} 0 \\ \boxed{1} \\ 0 \end{array}$$

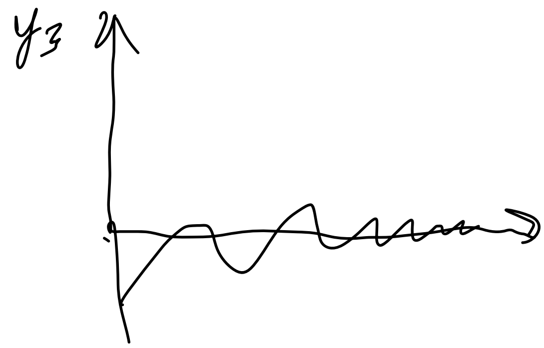
$$y_t = \hat{\mu} + \boxed{C_0 \Omega^{-1/2}} \varepsilon_t + C_1 \Omega^{-\frac{1}{2}} \varepsilon_{t-1} + \dots$$

0 1 2

y_2 y_1







SVAR(p)

$$B_0 y_t = \mu + B_1 y_{t-1} + \dots + B_p y_{t-p} + \varepsilon_t \quad \sim N(0, \Sigma)$$

Cointegrating relations

$$y_t = \underbrace{B_0^{-1}\mu}_{\tilde{\mu}} + \underbrace{B_0^{-1}B_1}_{\Phi_1} y_{t-1} + \dots + B_0^{-1} B_p \cdot y_{t-p} + B_0^{-1}\varepsilon_t$$

$n \quad n^2 \quad \dots \quad n^2 \quad \frac{n(n-1)}{2}$

$$\cancel{pn^2} + \frac{n(n-1)}{2} + n \qquad \hat{\Omega} = B_0^{-1} B_0$$

$$n^2 + n + \cancel{pn^2} + n$$

$$n^2 + 2n \sim \frac{n^2}{2} + \frac{n}{2} - n$$

$$\frac{n^2}{2} + \frac{3n}{2} \qquad \frac{n(n+3)}{2}$$

1) Recursive elimination

B_0 — Lower triangular

2) Short-run restrictions

$A y_t = B \varepsilon_t$ Pagan(1995)

3) Long-Run restrictions Blanchard and Quah (1989)

4) sign restrictions

Uhlig (2005

5) Bayesian prior