

附录：

$$\Delta Y_t = u_t + \Psi_1 u_{t-1} + \Psi_2 u_{t-2} + \dots$$

$$\Delta Y_t = \Pi_1 \Delta Y_{t-1} + \Pi_2 \Delta Y_{t-2} + \dots + \Pi_p \Delta Y_{t-p} + u_t$$

$$\Delta Y_{t-1} = \Pi_1 \Delta Y_{t-2} + \Pi_2 \Delta Y_{t-3} + \dots + \Pi_p \Delta Y_{t-1-p} + u_{t-1}$$

...

$$\Delta Y_{t-j} = \Pi_1 \Delta Y_{t-j-1} + \Pi_2 \Delta Y_{t-j-2} + \dots + \Pi_p \Delta Y_{t-j-p} + u_{t-j}$$

...

$$\Delta Y_t = \Pi_1 (\Pi_1 \Delta Y_{t-2} + \Pi_2 \Delta Y_{t-3} + \dots + \Pi_p \Delta Y_{t-1-p} + u_{t-1}) + \Pi_2 \Delta Y_{t-2} + \dots$$

$$+ \Pi_p \Delta Y_{t-p} + u_t$$

$$= u_t + \Pi_1 u_{t-1} + (\Pi_1^2 + \Pi_2) \Delta Y_{t-2} + (\Pi_1 \Pi_2 + \Pi_3) \Delta Y_{t-3} + \dots$$

$$+ (\Pi_1 \Pi_p + \Pi_{p-1}) \Delta Y_{t-p+1} + \Pi_p \Delta Y_{t-p}$$

$$= u_t + \Pi_1 u_{t-1} + (\Pi_1^2 + \Pi_2) u_{t-2} + ((\Pi_1^2 + \Pi_2) \Pi_1 + (\Pi_1 \Pi_2 + \Pi_3)) \Delta Y_{t-3}$$

$$+ ((\Pi_1^2 + \Pi_2) \Pi_2 + \Pi_1 \Pi_3 + \Pi_4) \Delta Y_{t-4} + \dots$$

$$+ ((\Pi_1^2 + \Pi_2) \Pi_{p-3} + \Pi_1 \Pi_{p-2}) \Delta Y_{t-p+2} + (\Pi_1 \Pi_p + \Pi_{p-1}) \Delta Y_{t-p+1} + \Pi_p \Delta Y_{t-p}$$

$$\Delta Y_t = u_t + \Pi_1 u_{t-1} + (\Pi_1^2 + \Pi_2) u_{t-2} + ((\Pi_1^2 + \Pi_2) \Pi_1 + (\Pi_1 \Pi_2 + \Pi_3)) u_{t-3}$$

$$+ [((\Pi_1^2 + \Pi_2) \Pi_1 + (\Pi_1 \Pi_2 + \Pi_3)) \Pi_1 + ((\Pi_1^2 + \Pi_2) \Pi_2 + \Pi_1 \Pi_3 + \Pi_4)] u_{t-4}$$

$$+ \dots + (\Pi_1 \Pi_p + \Pi_{p-1}) \Delta Y_{t-p+1} + \Pi_p \Delta Y_{t-p}$$

$$\Delta Y_t = u_t + \Psi_1 u_{t-1} + (\Psi_1 \Pi_1 + \Pi_2) u_{t-2} + (\Psi_2 \Pi_1 + \Psi_1 \Pi_2 + \Pi_3) u_{t-3}$$

$$+ \dots + (\Psi_{j-1} \Pi_1 + \Psi_{j-2} \Pi_2 + \dots + \Psi_2 \Pi_{j-2} + \Psi_1 \Pi_{j-1} + \Pi_j) u_{t-j} + \dots$$