

$$\frac{1}{(1-r)^n}=\sum_{i=1}^{\infty}\binom{i+n-1}{n-1}r^i$$

$$\phi(B)X_t = \theta(B)Z_t$$

$$X_t = \frac{\theta(B)}{\phi(B)} Z_t = \sum_{i=0}^\infty \psi_i Z_{t-i}$$

$$X_t = \sum_{j=-\infty}^\infty \psi_j Z_{t-j}\\ \gamma(k) = \sigma^2 \sum_{j=-\infty}^\infty \psi_j \psi_{j+|k|}$$

$$\begin{aligned}\Gamma &= \{\gamma(j-i); 1\leq i\leq p, 1\leq i\leq p\} \\ \gamma' &= (\gamma(1),\gamma(2),\ldots,\gamma(p)) \\ \phi' &= (\phi_1,\ldots,\phi_2)\end{aligned}$$

$$\text{Yule-Walker}$$

$$\begin{aligned}\hat{\phi} &= \hat{\Gamma}'\hat{\gamma} \\ \hat{\sigma}^2 &= \hat{\gamma}(0)-\hat{\phi}'\hat{\gamma}\end{aligned}$$

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