Yule-Walker in matrix form and Yule-Walker estimation

Тест, 4 вопроса

1 Баллы

1.
Find and write Yule-Walker equations in matrix form for the AR(3) process

$X_t = \frac{1}{2}X_{t-1} + \frac{1}{9}X_{t-2} - \frac{1}{18}X_{t-3} + Z_t.$

- [x] $\begin{bmatrix}\rho(1)\\ \rho(2)\\ \rho(3)\end{bmatrix} = \begin{bmatrix}1 & \rho(1) & \rho(2)\\ \rho(1) & 1 & \rho(1)\\ \rho(2) & \rho(1) & 1\end{bmatrix}\begin{bmatrix}\frac{1}{2}\\ \frac{1}{9}\\ -\frac{1}{18}\end{bmatrix}$
- [ ] $\begin{bmatrix}\rho(1)\\ \rho(2)\\ \rho(3)\end{bmatrix} = \begin{bmatrix}\rho(0) & \rho(1) & \rho(2)\\ \rho(1) & \rho(0) & \rho(1)\\ \rho(2) & \rho(1) & \rho(0)\end{bmatrix}\begin{bmatrix}\frac{1}{2}\\ \frac{1}{9}\\ -\frac{1}{18}\end{bmatrix}$
- [ ] $\begin{bmatrix}\rho(1)\\ \rho(2)\\ \rho(3)\end{bmatrix} = \begin{bmatrix}1 & \frac{1}{9} & \frac{1}{2}\\ \frac{1}{9} & 1 & -\frac{1}{18}\\ \frac{1}{2} & -\frac{1}{18} & 1\end{bmatrix}\begin{bmatrix}\rho(0)\\ \rho(1)\\ \rho(2)\end{bmatrix}$

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1 Баллы

2.
Sample autocorrelation coefficients of an AR(3) process are given: $r_1 = 0.8$, $r_2 = 0.6$, and $r_3 = 0.2$. Use Yule-Walker equations in matrix form to estimate model parameters $\hat{\phi}_1$, $\hat{\phi}_2$, $\hat{\phi}_3$.

- (•) $\hat{\phi}_1 = 0.8125, \hat{\phi}_2 = 0.5000, \hat{\phi}_3 = -0.6875.$
- ( ) $\hat{\phi}_1 = 0.8, \hat{\phi}_2 = 0.6, \hat{\phi}_3 = 0.2$

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1 Баллы

3.
Use Question 2 information and the fact that sample autocovariance at lag 0, $c(0)=5
$to estimate the variance of the noise in the same $AR(3)$ process, i.e.,$\hat{\sigma^2}=?$

- ( ) $\hat{\sigma^2} = 5$
- (•) $\hat{\sigma^2} = 0.9375$

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1 Баллы

4.
Which of the following is the fitted model to the process described above in Question 2 and Question 3?

- (•) $X_t = 0.8125X_{t-1} + 0.5000X_{t-2} - 0.6875X_{t-3} + Z_t.$

where $\hat{\sigma_Z^2} = 0.9375$

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- $X_t = 0.8X_{t-1} + 0.6X_{t-2} + 0.2X_{t-3} + Z_t.$

  where $\hat{\sigma_Z^2} = 0.9375$

- $X_t = 0.8125X_{t-1} + 0.5000X_{t-2} - 0.6875X_{t-3} + Z_t.$

  where $\hat{\sigma_Z^2} = 5$

Я понимаю, что отправка работы, выполненной не мной, может привести к тому, что курс не будет засчитан, а аккаунт Coursera заблокирован.

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