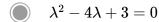# Difference equations and Yule-Walker equations

Тест, 6 вопроса

1
Баллы

1.

The following difference equation is given: $a_n = 4a_{n-1} - 3a_{n-2}$. What is the auxiliary or the characteristic equation?

- ◉ $\lambda^2 - 4\lambda + 3 = 0$

- ◯ $\lambda^2 + 4\lambda - 3 = 0$

- ◯ $a_n - 4a_{n-1} + 3a_{n-2} = 0$

1
Баллы

2.

Solve the difference equation $a_n = 4a_{n-1} - 3a_{n-2}$.

- ☑ $a_n = c_1 + c_2 3^n$

- ☐ $a_n = 1 + 3^n$

- ☑ $a_n = c_1 3^n + c_2$

1
Баллы

3.

Solve the difference equation $a_n = 4a_{n-1} - 3a_{n-2}$ with initial data $a_0 = 2$ and $a_1 = -2$.

- ◉ $a_n = 4 - 2(3^n)$

- ◯ $a_n = 6 - 4(2^n)$

Difference equations and Yule-Walker equations

Тест, 6 вопроса

4.

Stationary AR(1) process is given: $X_t = 0.4X_{t-1} + Z_t$. Find the Yule-Walker equations.

○ $(1 - 0.4B)X_t = Z_t$

○ $\rho(k) = 0.4\rho(k-1)$ when $k \geq 1$.

⦿ $\rho(k) = 0.4\rho(k-1)$ for all $k \in \mathbb{Z}$.

1

Баллы

5.

Find the solution of the Yule-Walker equations of the process $X_t = 0.4X_{t-1} + Z_t$.

☐ $\rho(k) = c0.4^k$ for $k \geq 1$.

☐ $\rho(k) = 0.4^k$ for $k \geq 0$.

☑ $\rho(k) = 0.4^k$ for $k \geq 0$, and $\rho(k) = \rho(-k)$ for $k \in \mathbb{Z}^-$.

1

Баллы

6.

Find the Yule-Walker equations and general solutions of them that govern autocorrelation coefficients of the AR(3) process

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

○ $\rho(k) = \frac{1}{2}\rho(k-1) + \frac{1}{9}\rho(k-2) - \frac{1}{18}\rho(k-3)$

$\rho(k) = c_1(\frac{1}{2})^k + c_2(\frac{1}{9})^k + c_3(-\frac{1}{18})^k$

○ $18\rho(k) = 9\rho(k-1) + 2\rho(k-2) - \rho(k-3)$

$\rho(k) = c_1(2)^k + c_2(9)^k + c_3(-18)^k$

⦿ $\rho(k) = \frac{1}{2}\rho(k-1) + \frac{1}{9}\rho(k-2) - \frac{1}{18}\rho(k-3)$

$\rho(k) = c_1(\frac{1}{2})^k + c_2(\frac{1}{3})^k + c_3(-\frac{1}{3})^k$

Difference equations and Yule–Walker equations

Тест, 6 вопроса

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