**Homework Rules (Read carefully)**

1. PLEASE READ THE QUESTIONS!!!
2. You must do your assignment alone
3. You can consult with me for help on the homeworks, but please don’t get help anyone else.
4. NO late homeworks will be accepted since the answers of this homework will be shared with you at the same day by e-mail.
5. Please show all the details of your solutions and interpret all results
6. PLEASE GIVE YOUR ASSIGNMENT SOLUTIONS AS **HARD COPY**.

**QUESTIONS**

1. (20 pt) For the following model:

Where

1. State the name of the process and write the parameters
2. Verify whether it is stationary and/or invertible
3. Express the model in an MA representation if it exists
4. Express the model in an AR representation if it exists.
5. (30 pt) Consider the process



where it is assumed that {*at*}

1. *(5 pts.)* Is the process stationary and/or invertible. Show.
2. *(15 pts.)* Find the autocorrelation function (ACF) of the process, if possible. If it is not possible, explain why and try to find ACF after applying some operations.
3. What is the name of th*e* process?
4. (15 pt) Consider the following models:

Where *at* ~ WN(0, )

1. Is the series stationary?
2. Find the mean, variance of *Zt* series
3. Find the general expression for *ρk* , *γk*
4. (20 pt) **A**. Write the models in the backshift operator form
5. SARIMA(2,1,2)(1,2,0)12
6. SARIMA(3,0,1)(0,2,2)4

**B**. Write the name of the models which are already in backshift operator form and decide whether the “series is stationary. If no, please the reason of the nonstationarity

3. (15 pt) Consider the following stochastic processes:
4. 
5. 
6. 
7. 

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| --- | --- |
| **A** | C:\Users\Petek\Desktop\Rplot.png |
| **B** |  |
| **C** |  |
| **D** |  |

Match the presented time series plots A to D with the generating stochastic processes given by i) to vi). Explain the reasons of your identification.