Week 4 - AYU - Individual

#### Problem (Sample - Question 3)

You are given:

1. The random walk model

where denote observations from a white noise process.

1. The following nine observed values of :

| t | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2 | 3 | 5 | 3 | 4 | 2 | 4 | 1 | 2 |

1. The average value of is 2.
2. The 9 step ahead forecast of , is estimated based on the observed value of 10 y .

Calculate the forecast error,

1. 1
2. 2
3. 3
4. 8
5. 18

#### Problem (Sample - Question 4)

You are given:

1. The random walk model

where denote observations from a white noise process.

1. The following ten observed values of :

| t | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2 | 5 | 10 | 13 | 18 | 20 | 24 | 25 | 27 | 30 |

Calculate the standard error of the 9 step-ahead forecast, 19 yˆ .

1. 4/3
2. 4
3. 9
4. 12
5. 16

#### Problem (Sample - Question 21)

A random walk is expressed as

where

and

Determine which statements is/are true with respect to a random walk model.

I. If , then the random walk is nonstationary in the mean.  
II. If , then the random walk is nonstationary in the variance.  
III. If , then the random walk is nonstationary in the variance.

1. None
2. I and II only
3. I and III only
4. II and III only
5. The correct answer is not given by (A), (B), (C), or (D).

#### Problem (Sample - Question 22)

A stationary autoregressive model of order one can be written as

Determine which of the following statements about this model is false

1. The parameter must not equal 1.
2. The absolute value of the parameter must be less than 1.
3. If the parameter , then the model reduces to a white noise process.
4. If the parameter , then the model is a random walk.
5. Only the immediate past value, , is used as a predictor for .

#### Problem (Sample - Question 31)

Determine which of the following indicates that a nonstationary time series can be represented as a random walk

I. A control chart of the series detects a linear trend in time and increasing variability.

1. The differenced series follows a white noise model.
2. The standard deviation of the original series is greater than the standard deviation of the differenced series.
3. I only
4. II only
5. III only
6. I, II and III
7. The correct answer is not given by (A), (B), (C), or (D).

#### Problem (Sample - Question 38)

You are given two models:

Model L:

where is a white noise process, for

Model M:

where is a white noise process, for Determine which of the following statements is/are true.

I. Model L is a linear trend in time model where the error component is not a random walk. II. Model M is a random walk model where the error component of the model is also a random walk. III. The comparison between Model L and Model M is not clear when the parameter

1. I only
2. II only
3. III only
4. I, II and III
5. The correct answer is not given by (A), (B), (C), or (D).

#### Problem (Sample - Question 46)

A time series was observed at times 0, 1, …, 100. The last four observations along with estimates based on exponential and double exponential smoothing with are:

| Time () | 97 | 98 | 99 | 100 |
| --- | --- | --- | --- | --- |
| Observation () | 96.9 | 98.1 | 99.0 | 100.2 |
| Estimates () | 93.1 | 94.1 | 95.1 |  |
| Estimates () | 88.9 | 89.9 |  |  |

All forecasts should be rounded to one decimal place and the trend should be rounded to three decimal places.

Let F be the predicted value of using exponential smoothing with .

Let G be the predicted value of using double exponential smoothing with .

Calculate the absolute difference between F and G,

1. 0.0
2. 2.1
3. 4.2
4. 6.3
5. 8.4

#### Problem (Sample - Question 55)

You are given the following eight observations from a time series that follows a random walk model:

|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 3 | 5 | 7 | 8 | 12 | 15 | 21 | 22 |

You plan to fit this model to the first five observations and then evaluate it against the last three observations using one-step forecast residuals. The estimated mean of the white noise process is 2.25.

Let F be the mean error (ME) of the three predicted observations.

Let G be the mean square error (MSE) of the three predicted observations.

Calculate the absolute difference between F and G,

1. 3.48
2. 4.31
3. 5.54
4. 6.47
5. 7.63

#### Problem (Sample - Question 58)

You are given the following six observed values of the autoregressive model of order one time series

|  | 1 | 2 | 3 | 4 | 5 | 6 |
| --- | --- | --- | --- | --- | --- | --- |
|  | 31 | 35 | 37 | 41 | 45 | 51 |

The approximation to the conditional least squares method is used to estimate and

Calculate the mean squared error that estimates

1. 13
2. 21
3. 22
4. 26
5. 35

#### Problem (Sample - Question 64)

You are given a stationary AR(1) model,

Determine which or the following is always true.