

# Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

10/10 points  
(100.00%)

Quiz, 10 questions

✓ **Congratulations! You passed!**

Next Item

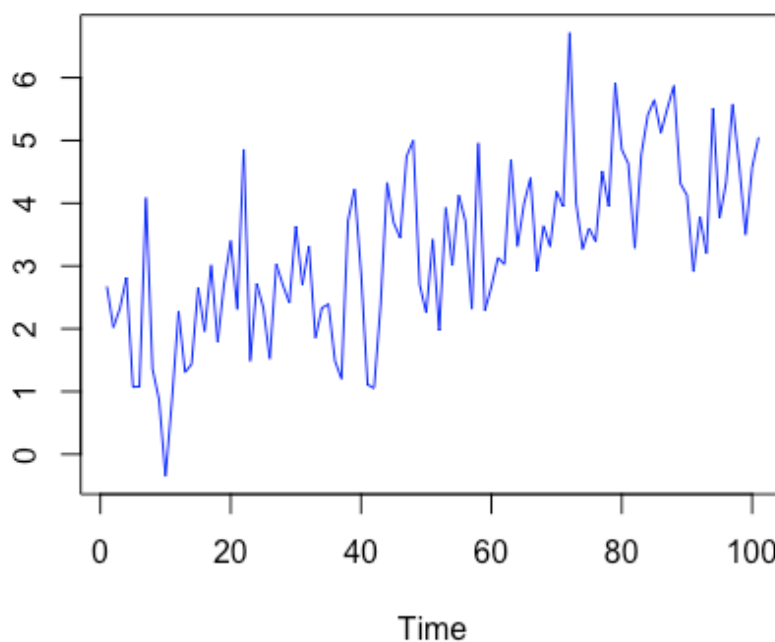


1 / 1  
points

1.

Time plot of a time series is shown. What can be said about the stationarity of this time series?

**Some time series**



- ☐ It is a stationary time series.
- ☐ It is a non-stationary time series since there is a fluctuation.
- ☐ It is stationary since there is a trend.



It is a non-stationary time series since there is a trend.

## Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

Correct

Correct! Trend makes the time series non-stationary.

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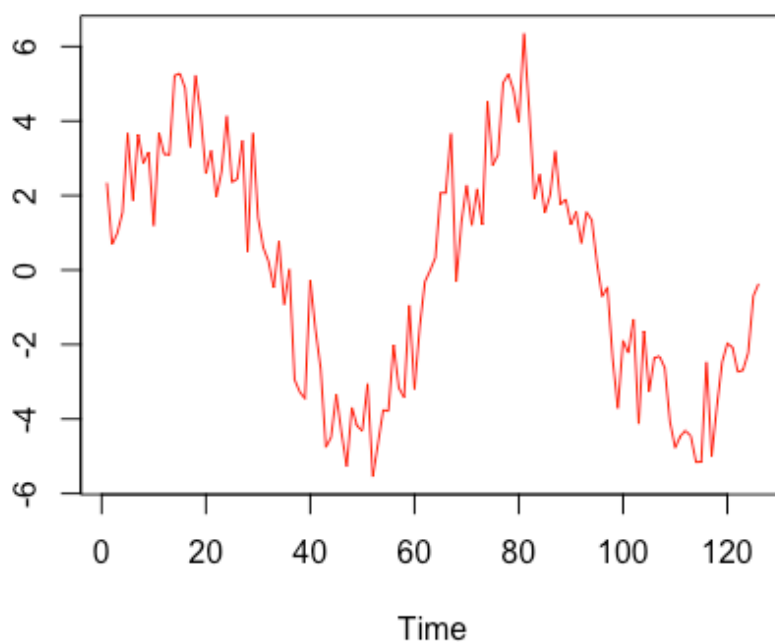


1 / 1  
points

2.

Time plot of a time series is shown. Select one or more that can be said about the stationarity of this time series.

Some time series



It is stationary.



Un-selected is correct



It is non-stationary.



Correct

Correct! Seasonality can be seen in the time plot.

## Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

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It is non-stationary since there is a trend.

**Correct**

Correct! One part of the plot shows upward trend while other part shows a downward trend.

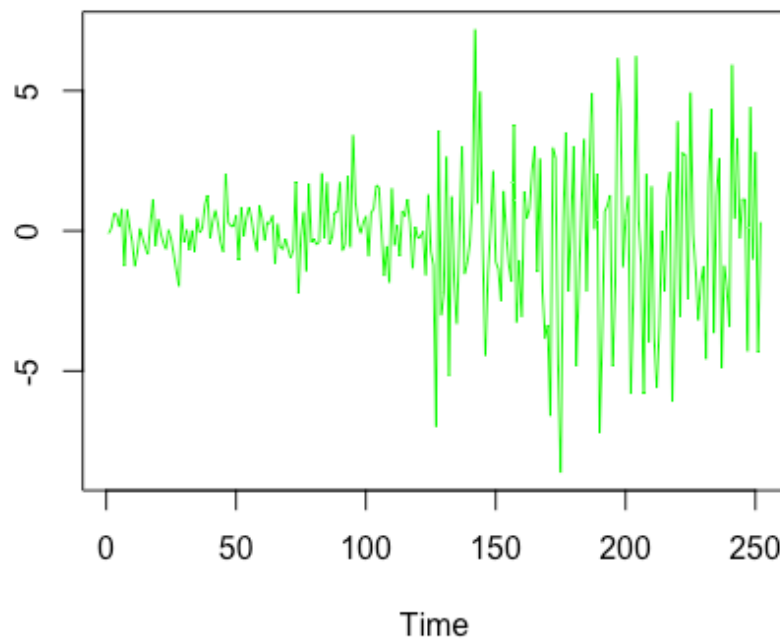


1 / 1  
points

3.

Time plot of a time series is shown. Select one or more that can be said about the stationarity of this time series.

**Some time series**



It is a stationary time series since there is no trend.

**Un-selected is correct**

# Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

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It is a stationary time series since there is no seasonality.



Un-selected is correct



It is a non-stationary time series.



**Correct**

Correct! There is a systematic change in the variation in the time series. At some point, the variation has increased.



It maybe combination of two stationary time series.



**Correct**

Correct! Around time 130 ish, variation increased suddenly. This time series can be a combination of two stationary time series.



1 / 1  
points

4.

```
1 # Simulating a non-stationary time series
2
3 # Set seed so that we generate the same dataset
4 set.seed(2017)
5 # time variable
6 t=seq(0,1,1/100)
7 # generate a time series
8 some.time.series=2+3*t+ Runm(length(t))
9
10 # obtain acv for this time series below
11 (acf(some.time.series, type="covariance"))
```

What is sample autocovariance coefficient  $c_5$ ?



5



0.640



0.403



**Correct**

Correct!



1.717

## Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

10/10 points  
(100.00%)

Quiz, 10 questions



1 / 1  
points

5.

What is the sample autocorrelation coefficient  $r_0$  for any time series?



Depends on the time series.



It is 1.

**Correct**

Correct! Any time series has correlation 1 with itself, i.e., autocorrelation at lag 0 is 1.



1 / 1  
points

6.

```
1 # Simulating a non-stationary time series
2
3 # Set seed so that we generate the same dataset
4 set.seed(2017)
5 # time variable
6 t=seq(0,1,1/100)
Run 7 # generate a time series
8 some.time.series=2+3*t+ rnorm(length(t))
Reset 9 # obtain acf of the time series below
10 (acf(some.time.series))
```

What is  $r_5$ ?



0.233

**Correct**

Correct!



Cannot be calculated since it is non-stationary time series.



1



points

## Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

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(100.00%)**

Quiz, 10 questions

Which one or more of the following can be said about the random walk?



Random walk model relates current value of the time series to the previous value by adding some random deviation to the previous value.

**Correct**Correct! Random Walk model is  $X_t = X_{t-1} + Z_t$ 

Random walk is a stationary stochastic process.

**Un-selected is correct**

Random walk is the accumulation of random deviations from previous steps until the current time.

**Correct**Correct!  $X_t = \sum_{i=1}^t Z_i$ .1 / 1  
points

8.

How one can obtain a stationary stochastic process from the random walk?



Using the difference operator.

**Correct**

Correct!



One cannot.

1 / 1  
points

# Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

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(100.00%)

9.

Which one or more of the following can be said about moving average processes?



The current value of the process now is a linear combination of the noises from current and past time steps.



**Correct**

Correct!



Autocorrelation function of the process decreasing slowly without hitting zero.



**Un-selected is correct**



Autocorrelation function of the process cuts off and becomes zero at the order of the process.



**Correct**

Correct!



1 / 1  
points

10.

```
1 # Simulating MA(4) process.
2 # X_t= Z_t+0.2 Z_(t-1)+0.3 Z_(t-2)+ 0.4 Z_(t-3)
3
4 set.seed(2^10)
5 z=NULL
6 z=rnorm(1000)
7 data=NULL
8 for(i in 4:1000){
9   data[i-3]=z[i]+0.2*z[i-1]+0.3*z[i-2]+0.4*z[i-3]
10 }
11 data=ts(data)
12
13 # find acf below
14 acf(data)
15
```

Run

Reset

What is the autocorrelation coefficient at lag 4?



0



**Correct**

Theoretically, it is 0 starting at lag 4. But for a time series, it will be some value which is nonsignificant.

## Time plots, Stationarity, ACV, ACF, Random Walk and MA processes

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**(100.00%)**

Quiz, 10 questions



0.022



**Un-selected is correct**

