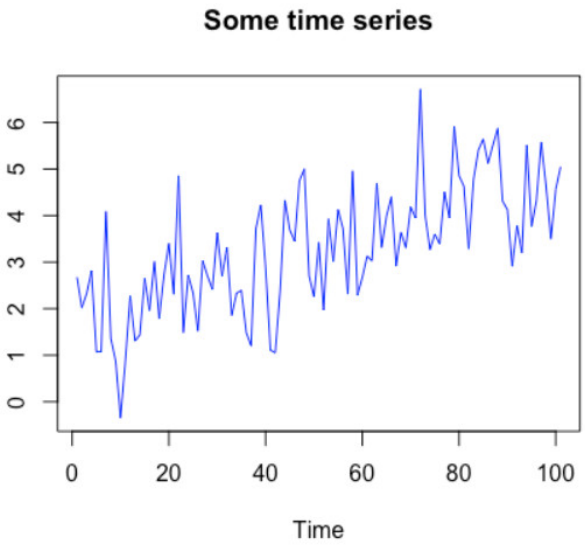
Week2-Quiz

2020年12月6日　11:43

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

1 / 1 point

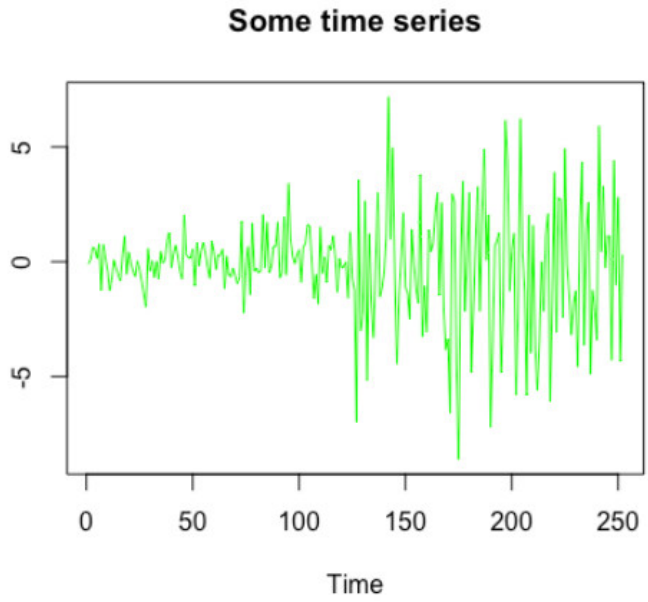


- ○ It is a staionary time series.
- ○ It is a non-stationary time series since there is a fluctuation.
- ○ It is stationary since there is a trend.
- ◉ It is a non-stationary time series since there is a trend.

✓ **Correct**

Correct! Trend makes the time series non-stationary.

3. Time plot of a time series is shown. Select one or more that can be said about the stationarity of this time series. **1 / 1 point**



- [ ] It is a stationary time series since there is no trend.
- [ ] It is a stationary time series since there is no seasonality.
- [x] 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.

- [x] 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.

4.

```r
# Simulating a non-stationary time series

# Set seed so thet we generate the same dataset
set.seed(2017)
# time variable
t=seq(0,1,1/100)
# generate a time series
some.time.series=2+3*t+ rnorm(length(t))
(acf(some.time.series, type="covariance"))
# obtain acv for this time series below

```

Run

Reset

1 / 1 point

What is sample autocovariance coefficient c_5?

- 5
- 0.640
- 0.403
- 1.717

Correct

Correct!

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

1 / 1 point

- 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.

6.

```r
# Simulating a non-stationary time series

# Set seed so thet we generate the same dataset
set.seed(2017)
# time variable
t=seq(0,1,1/100)
# generate a time series
some.time.series=2+3*t+ rnorm(length(t))
# obtain acf of the time series below
```

Run

Reset

1 / 1 point

What is r_5?

- 0.233
- Cannot be calculated since it is non-stationary time series.
- 1

Correct

Correct!

7. Which one or more of the following can be said about the random walk? **1 / 1 point**

- [x] 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.
- [x] Random walk is the accumulation of random deviations from previous steps until the current time.

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

8. How one can obtain a stationary stochastic process from the random walk? **1 / 1 point**

- (•) Using the difference operator.
- ( ) One cannot.

Correct
Correct!

9. Which one or more of the following can be said about moving average processes? **1 / 1 point**

- [x] 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.
- [x] Autocorrelation function of the process cuts off and becomes zero at the order of the process.

Correct
Correct!

10.

1 / 1 point

```r
# Simulating MA(4) process.
# X_t= Z_t+0.2 Z_(t-1)+0.3 Z_(t-2)+ 0.4 Z_(t-3)

set.seed(2^10)
z=NULL
z=rnorm(1000)
data=NULL
for(i in 4:1000){
  data[i-3]=z[i]+0.2*z[i-1]+0.3*z[i-2]+0.4*z[i-3]
  }
data=ts(data)
acf(data,, type="covariance")
# find acf below

```

Run

Reset

What is the autocorrelation coefficient at lag 4?

- [x] **0**

Correct

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

- [ ] 0.022