TAutoCorr.R Summary

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October 2019

1 Original code

Listing 1: Source code for TAutoCorr.R(including comments)

```
# R practicals
# read data and compute correlation and p-value

# read data from KeyWestAnnualMeanTemperature.Rdata
load(file = "/home/nelson/Documents/CMEECoursework/Week3/
    MyRCoursework/Data/KeyWestAnnualMeanTemperature.RData")

# correlation
correlation <- cor(ats)[2,1]

# function of compute randomly permuting time series and
    calculate correlation
random_correlation <- function(x){
  a <- sample(x[,1],100) # random sample the 100 years of
      time series
  b <- cbind(a,x[,2]) # combine sampled time series and
      original temperature
  return(cor(b)[2,1]) # return the calculated correlation
}

# calculate the random correlation 10000 times
RandCor <- sapply(1:10000, function(i) random_correlation(
    ats))

# calculate the fraction of the correlation coefficients(p-
    value)
p <- sum(RandCor > correlation)/10000
```

```
> correlation
[1] 0.5331784
> p
[1] 3e-03
```

2 Results and conclusion

From the code above, the correlation calculated by the given R data is about 0.326. This number illustrates that there is likely to be a correlation between the temperature of two successive years. We can see that more precisely by looking at another output variable, the p-value is 0.0003 in this situation. In particular from our code, this p-value means if we randomly permute time series 10000 times, there is only 3 times the random correlation will be bigger than the original correlation of the data. Generally if p-value is smaller than 0.05, there is a correlation between the temperature of two successive years. Therefore we can conclude that the temperature is positive correlated to the temperature one year before.