problem 4

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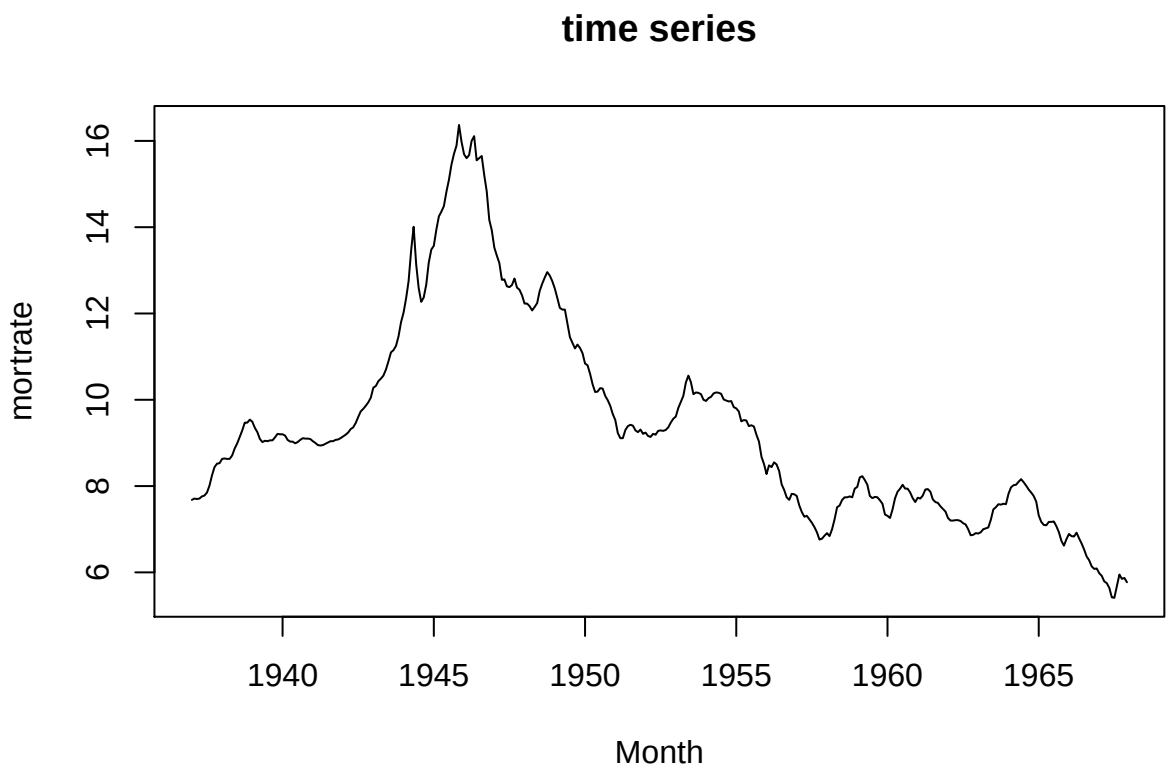
The file 'MortBond.txt' contains monthly effective interest rate z_t for conventional single- family mortgages from Jan. 1973 to Dec. 2003.

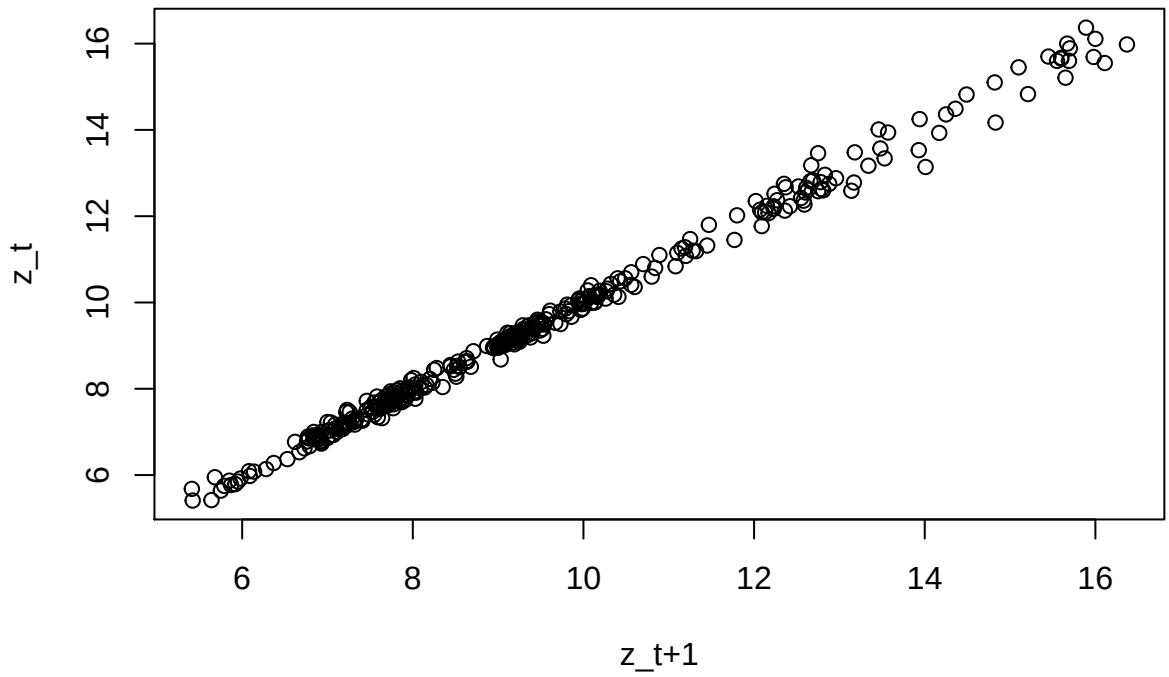
```
Mort = read.csv("MortBond.txt",head = T, sep="");
mortrate = ts(Mort[,2],start = 1937,freq =12);
```

(a) Draw threes plots: time plot of the time series, scatter plots of z_{t+1} versus z_t and of z_{t+2} versus z_t.

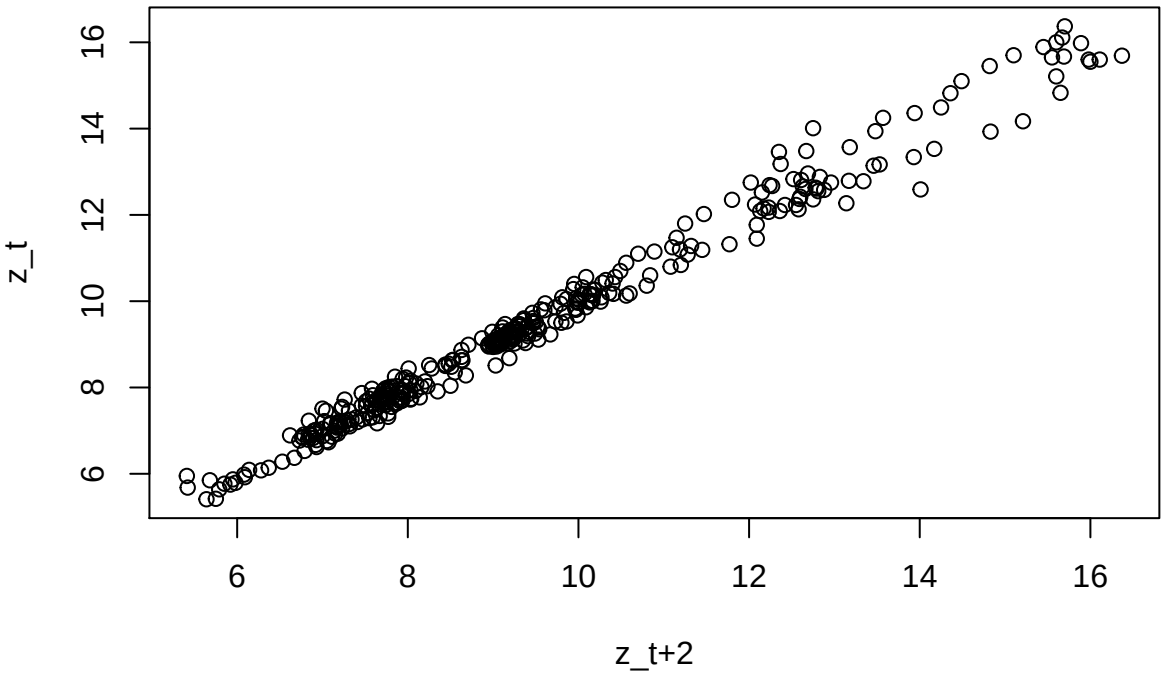
```
##-- second column is monthly interest rate for conventional single-family mortgage.
Mort = read.csv("MortBond.txt",head = T, sep="");
mortrate = ts(Mort[,2],start = 1937,freq =12);
ts.plot(mortrate,gpars = list(xlab = "Month", ylab = "mortrate"),main = "time series")
```



```
z01 = tail(mortrate,-1)
z02 = tail(mortrate,-2)
z1 = head(mortrate,-1)
z2 = head(mortrate,-2)
plot(z1, z01, xlab = "z_t+1", ylab = "z_t")
```




```
plot(z2, z02, xlab = "z_t+2", ylab = "z_t")
```



(b) Based on the plots in (a), do you think that the series is autocorrelated? Comment on whether you think the time series is stationary.

Since the scatter plot is linear, the series is autocorrelated

Since the trend of the time series has a crest beyond 1980, it is not stationary.

(c) Plot the sample autocorrelation for this series up to lag 40. Relate this plot to the plots in (a).