

## Chapter 3 Problem 10

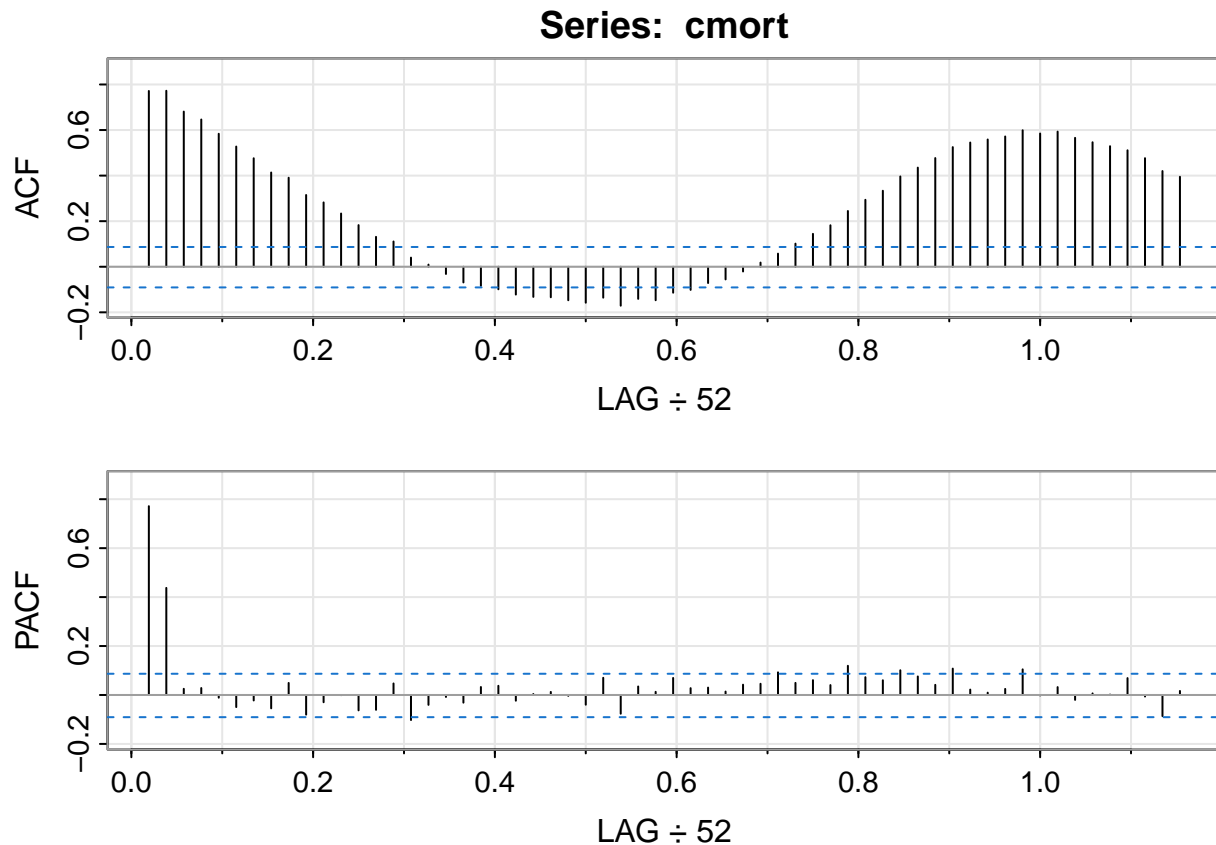
Andira Putri

Let  $x_t$  represent the cardiovascular mortality series (`cmort`) discussed in Chapter 2, Example 2.2. Fit an AR(2) to  $x_t$  using linear regression as in Example 3.17. Assuming the fitted model is the true model, find the forecasts over a four-week horizon,  $x_{n+m}^n$ , for  $m = 1, 2, 3, 4$ , and the corresponding 95% prediction intervals.

```
library(astsa)
```

```
## Warning: package 'astsa' was built under R version 4.3.2
```

```
data(cmort)
acf2(cmort,60)
```



```
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13]
## ACF  0.77 0.77 0.68 0.65 0.58 0.53 0.48 0.41 0.39 0.32 0.28 0.23 0.18
## PACF  0.77 0.44 0.03 0.03 -0.01 -0.05 -0.02 -0.05 0.05 -0.08 -0.03 0.00 -0.06
```

```
##      [,14] [,15] [,16] [,17] [,18] [,19] [,20] [,21] [,22] [,23] [,24] [,25]
## ACF    0.13  0.11  0.04  0.01 -0.03 -0.07 -0.08 -0.10 -0.12 -0.13 -0.13 -0.15
## PACF -0.06  0.05 -0.10 -0.04 -0.01 -0.03  0.03  0.04 -0.02  0.00  0.01  0.00
##      [,26] [,27] [,28] [,29] [,30] [,31] [,32] [,33] [,34] [,35] [,36] [,37]
## ACF   -0.16 -0.14 -0.17 -0.14 -0.15 -0.11 -0.10 -0.07 -0.06 -0.02  0.02  0.06
## PACF  -0.04  0.07 -0.08  0.03  0.01  0.07  0.03  0.03  0.01  0.04  0.05  0.09
##      [,38] [,39] [,40] [,41] [,42] [,43] [,44] [,45] [,46] [,47] [,48] [,49]
## ACF    0.10  0.14  0.18  0.24  0.29  0.33  0.4  0.44  0.48  0.53  0.55  0.56
## PACF   0.05  0.06  0.04  0.12  0.07  0.06  0.1  0.08  0.04  0.11  0.02  0.01
##      [,50] [,51] [,52] [,53] [,54] [,55] [,56] [,57] [,58] [,59] [,60]
## ACF    0.57  0.6  0.58  0.59  0.57  0.55  0.53  0.51  0.48  0.42  0.39
## PACF   0.02  0.1  0.00  0.03 -0.02  0.01  0.00  0.07 -0.01 -0.09  0.02
```

```
regr = ar.ols(cmort,order=2, demean=FALSE, intercept=TRUE)
regr$asy.se.coef # standard errors of the estimates
```

```
## $x.mean
## [1] 2.393673
##
## $ar
## [1] 0.03979433 0.03976163
```