Prob3.10

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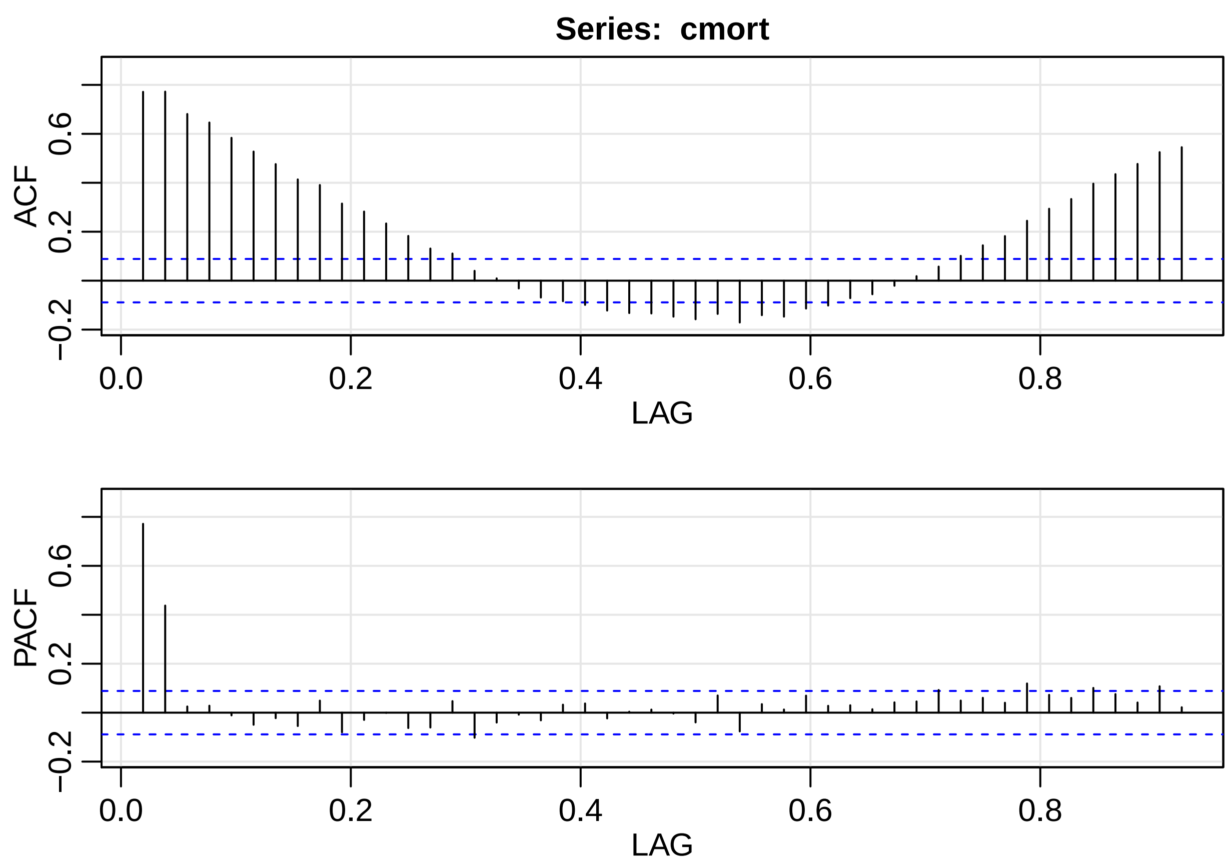
Let x_t represent the cardiovascular mortality series (cmort) discussed in Example 2.2.

(a)

Fit an AR(2) to x_t using linear regression as in Example 3.18.

```
library(astsa) # acf
acf2(cmort, 48)[1:2] # will produce values and a graphic
```




```
## [1] 0.77 0.77
```

```
(regr = ar.ols(cmort, order=2, demean=FALSE, intercept=TRUE))
```

```
##
## Call:
## ar.ols(x = cmort, order.max = 2, demean = FALSE, intercept = TRUE)
##
## Coefficients:
##      1       2
## 0.4286  0.4418
```

```
##
## Intercept: 11.45 (2.394)
##
## Order selected 2  sigma^2 estimated as  32.32
```

```r
regr$asy.se.coef # standard errors of the estimates
```

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

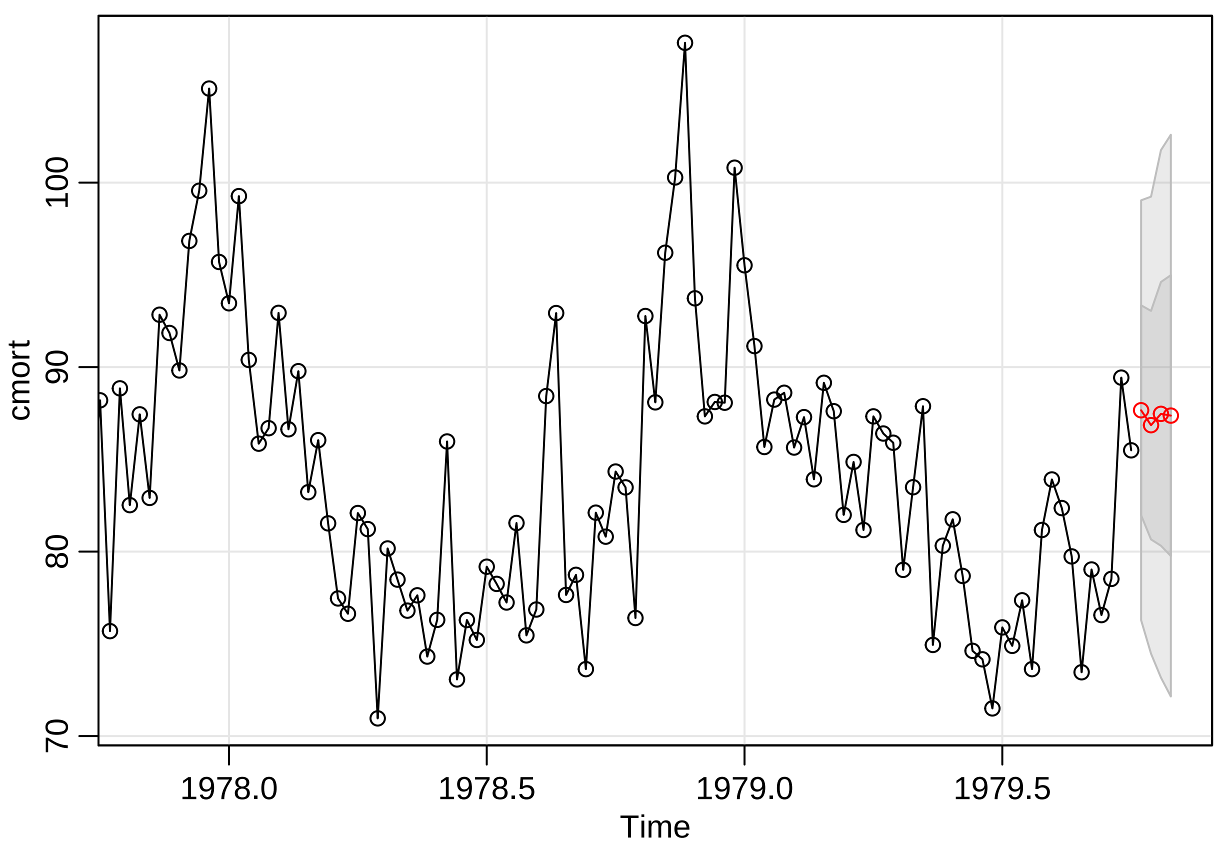
The fitted AR(2) model is :

$$x_t = 11.45 + 0.429x_{t-1} + 0.442x_{t-2} + w_t$$

(b)

Assuming the fitted model in (a) is the true model, find the forecasts over a four-week horizon, x^n_{n+m}, for $m = 1, 2, 3, 4$, and the corresponding 95% prediction intervals.

```r
n.ahead = 4
sarima.for(cmort, n.ahead, 2, 0, 0) # 4 forecasts with an AR(2) model for cmort
```




```
## $pred
## Time Series:
```

```
## Start = c(1979, 41)
## End = c(1979, 44)
## Frequency = 52
## [1] 87.66207 86.85311 87.46615 87.37190
##
## $se
## Time Series:
## Start = c(1979, 41)
## End = c(1979, 44)
## Frequency = 52
## [1] 5.689543 6.193387 7.148343 7.612531
```

Actual values are black. Predictions are red. Confidence intervals are grey (dark=68% and light=95%).