

Selvstudie 2

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Problem 10.2

An AR model has AR characteristic polynomial

$$(1 - 1.6x + 0.7x^2)(1 - 0.8x^{12})$$

a) Is the model stationary?

$$1 - 1.6x + 0.7x^2 - 0.8x^{12} + 1.28x^{13} - 0.56x^{14}$$

```
coeff <- c(1,-1.6,0.7,0,0,0,0,0,0,0,0,-0.8,1.28,-0.56)
roots <- polyroot(coeff)
sapply(roots , norm , type="2")
```

```
## [1] 1.018769 1.018769 1.018769 1.018769 1.018769 1.018769 1.018769
## [8] 1.018769 1.018769 1.018769 1.018769 1.018769 1.195229 1.195229
```

```
# arima.sim(list(ar = coeff[-1]),n = 1000) # Kan ikke køre ('ar' part of model is not stationary)
```

Ingen rødder på enhedscirklen \Leftrightarrow stationær

b) Identify the model as certain seasonal ARIMA model.

Problem 10.7

Suppose that the process $\{Y_t\}$ develops according to $Y_t = Y_{t-4} + e_t$ with $Y_t = e_t$ for $t = 1, 2, 3, 4$

a) Find the variance function for $\{Y_t\}$

$$\text{Var}[Y_t] = \text{ceiling}\left(\frac{t}{4}\right)^2 \sigma_e^2$$

b) Find the autocorrelation function for $\{Y_t\}$

c) Identify the model for $\{Y_t\}$ as a certain seasonal ARIMA