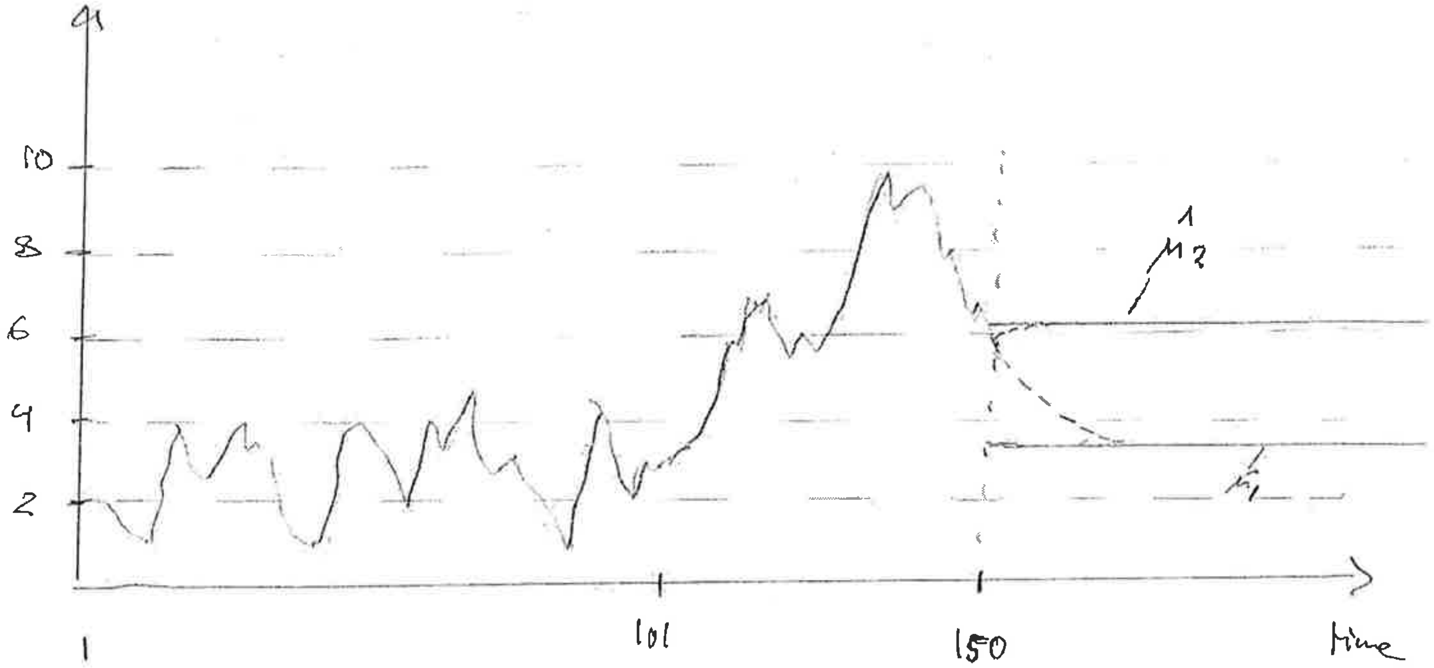
Sthun 2014-01-31

Remarks on diagnostic checking / evaluation

Recall the example series on p. 107 ($t=1,2,\dots,150$)



Assume that you estimate an AR(1) model for this series:

$Y_t = a_0 + a_1 Y_{t-1} + \varepsilon_t$ to obtain $\hat{a}_0 = 0.444$ (sign)

$\hat{a}_1 = 0.882$ (sign) (Estimated stationary model)

and also assume that $\{\hat{\varepsilon}_t\}$ series passes a W.N. test.
So, then everything seems to be in order, and you may for instance calculate/report that the long-run forecast equals

$\hat{\mu}_1 = \frac{\hat{a}_0}{1-\hat{a}_1} \approx 3.763$ (see graph)

However, if you also conduct a parameter instability test you may find a break at $t^*=101$ (say). Then, among other things, your long-run forecast is "wrong", and you should perhaps base the forecast on the estimates from the period $t=101,102,\dots,150$. Estimating an AR(1) model for this sample we obtain $\hat{a}_0 = 0.740$ (sign) and $\hat{a}_1 = 0.878$ (sign), and yields the long-run forecast: $\hat{\mu}_2 = \frac{0.740}{(1-0.878)} \approx 6.066$ ($\neq 3.763 = \hat{\mu}_1$) (see graph)

Example of a break series: $y_t = \begin{cases} 1 + 0.5 y_{t-1} + \varepsilon_t & t < 101 \\ 2.5 + 0.65 y_{t-1} + \varepsilon_t & t \geq 101 \end{cases}$ Sthm. 2012

(see p.107)