Assignment-5

Group 22

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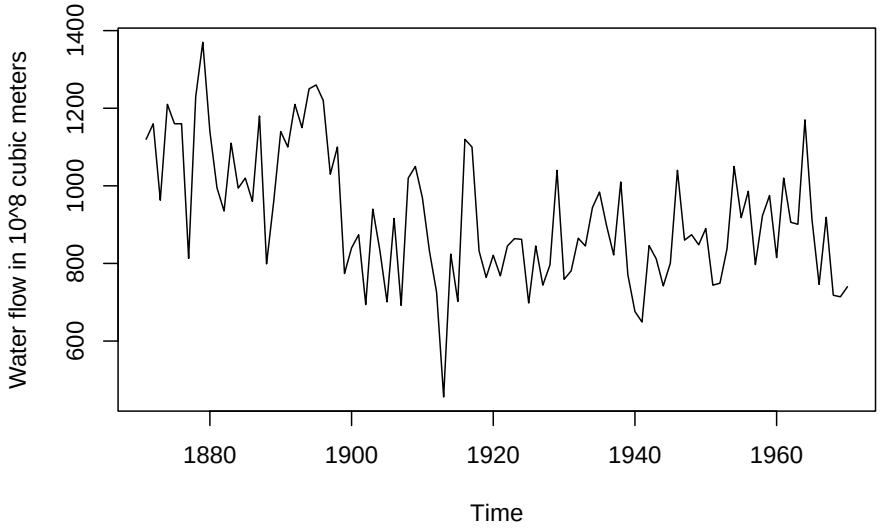
Graph 1: River Nile annual flow in 10^8 cubic meters (1871−1970)



Let us consider the following random walk plus noise model to be applied to the Nile data:

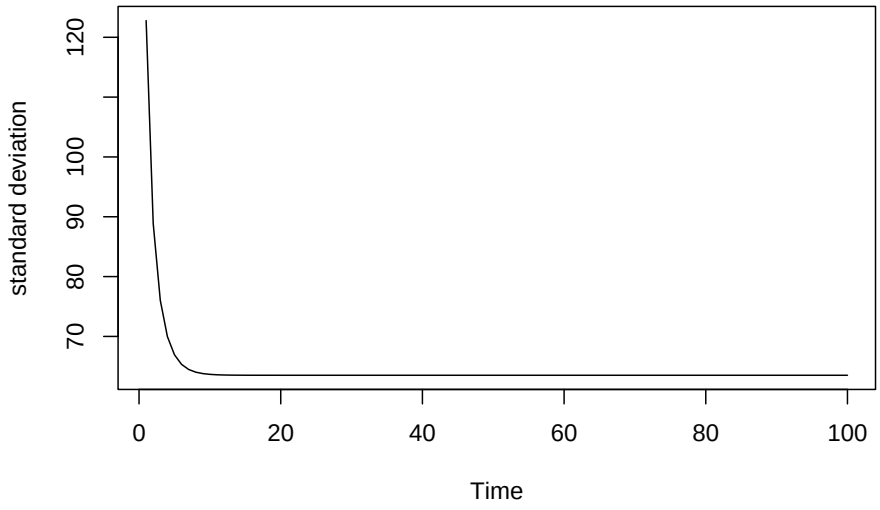
$$\begin{aligned} Y_t &= \theta_t + v_t \qquad v_t \overset{i.i.d.}{\sim} N(0, V) \\ \theta_t &= \theta_{t-1} + w_t \qquad v_t \overset{i.i.d.}{\sim} N(0, W) \end{aligned}$$

We will set V = 15100 and W = 1470 and the initial distribution $\theta_0 \sim N(1000, 1000)$ for our model Plotting the filtered estimates we get

i'm doing this because i don't know if there's any hidden function in this second method

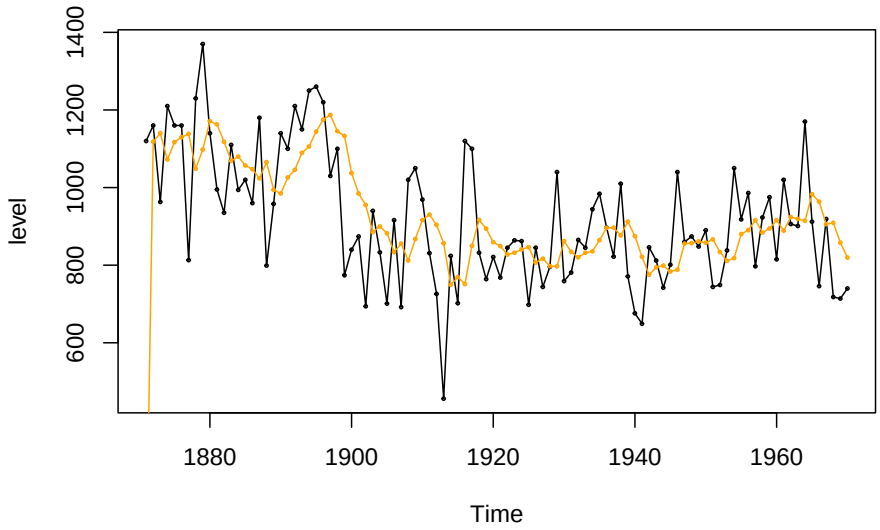
```
## [1] "y"   "mod" "m"   "U.C" "D.C" "a"   "U.R" "D.R" "f"
```

computing the variance

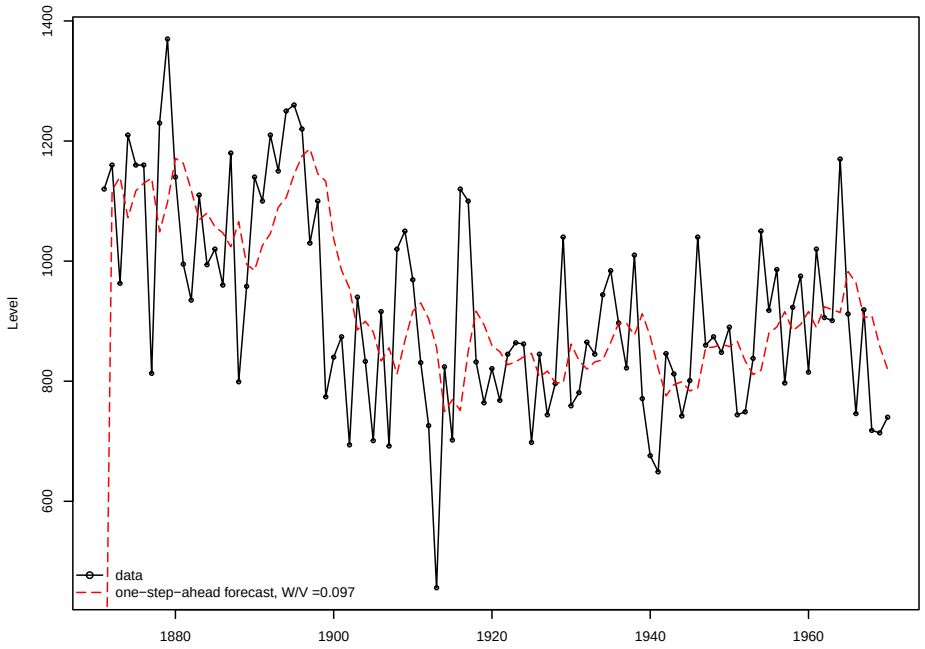


FORECASTING

i've made a few graph honestly i prefer the second one , in the final version you can delete the first



also here dropping the first observation would not be a bad idea i post the command here below: lines(dropFirst(outFilt$m), lty = "longdash", col='darkorange') instead of lines



variances here are random numbers i've choosen. As i said i'm not very fond of this part of theory so if you have better guesses on what values may be of interest feel free to change them

```
##             [,1]
## [1,] 0.09285714
```

```
##             [,1]
## [1,] 0.03333333
```

just the graph