Home Assignment 2

Using an FFT package of your choice, find the power spectrum of the time series provided in the file `http://th-www.if.uj.edu.pl/zfs/gora/timeseries21/assgn2.txt` and plot it on a log-log scale. Set the actual sampling time as the time unit so that the Nyquist frequency is $1/2$. Construct the Wiener filter, apply it to the data and plot the filtered signal. You may try using various window functions.

There are 4096 points in the data file. Try doing the same using the first 2048 or 1024 data points only.

The noise background is supposed to have the power spectrum

$$N(f) = \frac{\alpha^2}{1 + \beta^2 - 2\beta \cos\left(2\pi f/\tilde{f}\right)}$$

where $\tilde{f}$ sets the scale so that Nyquist frequency equals $\frac{1}{2}$. α^2 and β are the parameters that actually need to be fitted. The fit may be quite rough, do not waste too much time on fine-tuning these parameters.

I need to see the plots and I need to know what software packages, programming language and window functions you have used. I do not need to see the actual code.

Have fun,
PFG