In the name of God

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ADVANCED METHODS ON COMPUTATIONAL PHYSICS

Exercise Set 5

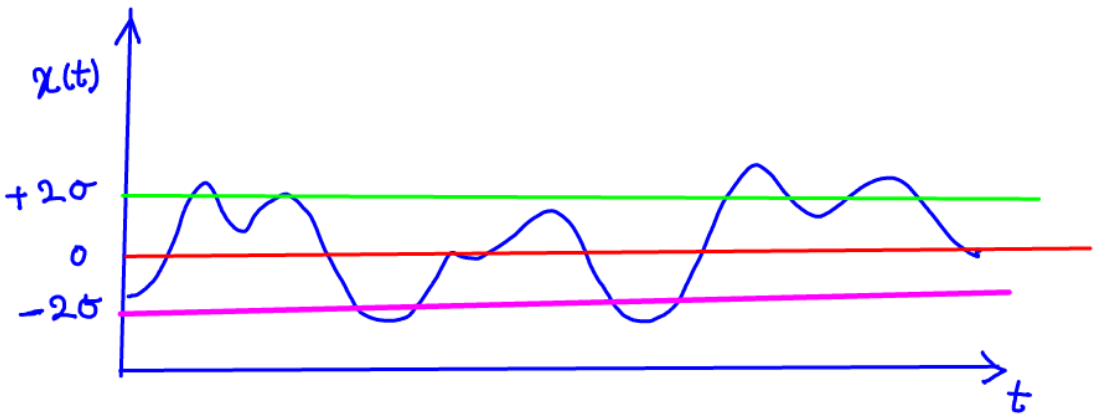
(Date Due: 1399/01/05)

1. Using the input file, write a proper program to do following tasks. Remember that you have split previous data into 100 part.

A : Compute $C(i,j) = \langle x(t_i)x(t_j)\rangle$. To this end you must do the averaging on 100 data sets. Make a matrix and plot it as a density plot.
B : Compute $C_i(\tau) = \langle x(t+\tau)x(t)\rangle$ for series and plot it for 5 sets of you data.

2. Base on simple algorithm for un-weighted Two-Point correlation function, calculate un-weighted two-point correlation of peaks for 1D data set at 0, $+2\sigma$ and -2σ levels. **Hint: "0" level means threshold at the average of data. In other word, we set the mean value of input data to zero,** $\langle x\rangle = 0$**. Also** $\sigma = \langle x^2\rangle$**, therefore** $+2\sigma$ **represents the threshold with value** $2 \times \sigma$ **and so on. See the plot on the next page.**

Good luck, Movahed


x(t)
+2σ
0
-2σ
t