In the name of God

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COMPUTATIONAL PHYSICS

Exercise Set 3

(Due Date: 1401/12/28)

Error analysis and propagation: Using the input file, write a proper program to do following tasks:
A : Read input data file which contains more than 10^6 one-column data. and spilt it to 100 input files.
B : Making directories and send each data set to corresponding directory.
C : compute the PDF ($p_i(x)$,, $i = 1, ..., 100$) of each data sets using Top-Hat kernel for $\Delta x = 0.1$, $\Delta x = 0.01$ and $\Delta x = 0.001$.
D : Compute $\sigma_m(p_i(x))$. Plot $p_i(x)$ versus x and show its error-bar for some of data sets.
E :Then based on smoothing approach, consider $\mathcal{B}(X) = e^{-X^2/2\sigma}$ with $\sigma = 2$, $\sigma = 0.2$ in order to smooth PDF. Explain you results.
E : Compute $p(x(i), x(j))$ and compare it with each one-point probability density function by determining $\Delta(\tau) = |p(x(t+\tau), x(t)) - p(x(t+\tau))p(x(t))|$. For 5 arbitrary sets plot $\Delta(\tau)$ as a function of τ. Explain your results.

Good luck, Movahed