

In the name of God

Department of Physics  
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ADVANCED TOPICS IN STATISTICAL PHYSICS II

Exercise Set 10

(Date Due: 1393/02/20)

1. Using the value of  $D^{(1)}, D^{(2)}, D^{(3)}, D^{(4)}$ , compute  $\langle x^4 \rangle$  as a function of  $\langle x^3 \rangle$  and  $\langle x^2 \rangle$  for data that you have.
2. By computing the  $D^{(1)}$  and  $D^{(2)}$  for  $\Delta x \equiv x(t + \tau) - x(t)$ , compute the correlation function,  $C_x(\tau) = \langle x(t + \tau)x(t) \rangle$ . Compare your results with that of given directly by data.
3. For data that you have, firstly compute a profile as  $Y(i) \equiv \sum_{j=1}^i x(j)$ , then compute the scaling exponents of  $S_q(\tau) \equiv \langle |Y(t + \tau) - Y(t)|^q \rangle \sim \tau^{\xi_q}$  and  $S_q(\tau) \sim S_3(\tau)^{\zeta_q}$ .

Good luck, Movahed

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