

Exercises in Statistical Mechanics

Based on course by Doron Cohen, has to be proofed
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This exercises pool is intended for a graduate course in “statistical mechanics”. Some of the problems are original, while other were assembled from various undocumented sources. In particular some problems originate from exams that were written by B. Horovitz (BGU), S. Fishman (Technion), and D. Cohen (BGU).

===== [Exercise 1020]

Formula for the canonical fluctuations in energy

Prove that $\sigma_E^2 = T^2 C_X$
Where $\sigma_E^2 \equiv \langle H^2 \rangle - \langle H \rangle^2$
and $C_X \equiv \left. \frac{\partial E}{\partial T} \right|_X$

Guideline: Express σ_E^2 by the distribution function and use the result we got for E in order to get the requested expression.