

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 0070]

The ergodic microcanonical density

Find an expression for $\rho(x)$ of a particle which is confined by a potential $V(x)$, assuming that the its state is microcanonical with energy E . Distinguish the special cases of $d = 1, 2, 3$ dimensions. In particular show that in the in the $d = 2$ case the density forms a step function. Contrast your results with the canonical expression $\rho(x) \propto \exp(-\beta V(x))$.