

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 2180]

Magnetization of spin 1/2 system

Find the state functions $E(T, B)$, $M(T, B)$, $S(T, B)$ for N spins system:

$$H = -\gamma B \sum_{a=1}^N \sigma_a^z$$

Write the results for a weak magnetic field $\gamma B \ll T$. Especially find the magnetic susceptibility χ and $S(B \rightarrow 0)$