

Exercises in Statistical Mechanics

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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 4001]

Two level system with N particles

Consider N particles in a two level system. The one-particle energies of the two levels are E_1 and E_2 . Consider separately the two following cases: (i) The particles can be distinguished; (ii) The particles are identical Bosons. Find the expectation values n_1 and n_2 of the occupation numbers. Discuss the special limits $N = 1$ and N infinity. Explain the connection with Fermi/Bose occupation statistics.