

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 5831]

Scaling form for the free energy

Given a free energy with the homogenous form

$$F = t^{2-\alpha} f(t/h^{1/\phi})$$

where h is the magnetic field and $t = (T - T_c)/T_c$.

- (a) Show that α is the conventional critical exponent of the specific heat.
- (b) Express the conventional β , δ exponents in terms of α , ϕ and show that $2 - \alpha = \beta(\delta + 1)$.