

Exercises in Statistical Mechanics

Based on course by Doron Cohen, has to be proofed
Department of Physics, Ben-Gurion University, Beer-Sheva 84105, Israel

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 7001]

Definition of power spectrum

Prove that the Fourier components of a stationary noisy signal have a variance which is proportional to the time of the measurement.

Show that the coefficient of proportionality is just the power spectrum (defined as the Fourier transform of the correlation function).