

Vybrané kapitoly zo štatistickej fyziky

Príklady z cvičenia

cviko bolo 20.4.2021

7.5 Linear Response Theory and the Fluctuation–Dissipation Theorem

Akkoľvek otázky smelo smerujte na [juraj\(a\)tekel\(b\)gmail\(c\)com](mailto:juraj(a)tekel(b)gmail(c)com)

Príklad 1 (Exercise 7.4). Compute the dynamic susceptibility for a Brownian particle of mass m in the presence of white noise $\xi(t)$ and fluid friction γ .

Príklad 2 (Exercise 7.5). Verify the Kramers–Kronig relations for the dynamic susceptibility in Exercise 7.4.

Príklad 3 (Exercise 7.6). Given the dynamic susceptibility $\chi(\omega) = (-im\omega + \gamma)^{-1}$ for simple Brownian motion (see Exercise 7.4) and the thermal average $\langle v^2 \rangle_T = kBT/m$, use the fluctuation–dissipation theorem to obtain the velocity autocorrelation function.

Príklad 4 (Exercise 7.7). Prove that $\bar{\xi}(0) = \bar{g}^{-1}/T$, where \bar{g} is the matrix whose matrix element is $g_{ij} = (\partial^2 S / \partial \alpha_i \partial \alpha_j)_U$.