

In the name of God

Department of Physics
Shahid Beheshti University

STOCHASTIC PROCESSES

Exercise Set 3

(Due Date: 1400/12/27)

1. For a smoothed stochastic field expand $\langle F \rangle$ around $\langle F \rangle_G$ up to $\mathcal{O}(\sigma_0^4)$.
2. Suppose that $F \equiv \delta_D(\alpha - \nu)$. So write a perturbative expansion of $\langle F \rangle$ up to $\mathcal{O}(\sigma_0^3)$ in 1-Dimension.
3. The necessary and sufficient condition to have Fourier transformation is the underlying field should be differentiable. Suppose that $x(t) \equiv \begin{cases} e^{-\alpha t} & \text{for } t \geq 0 \\ 0 & \text{for } t < 0 \end{cases}$ now compute the Fourier transformation and apply the inverse Fourier transform on your result and show that your result is not compatible with the initial function at $t = 0$ where the function is not differentiable.

Good luck, Movahed
