

In the name of God

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STOCHASTIC PROCESSES

Exercise Set 2

(Date Due: 1399/12/22)

1. PDF transformation: By using the flat random generator, produce random gaussian field. Check your results by computing PDF via simple algorithm.
2. PDF transformation: Suppose that in a black box a harmonic oscillator is oscillating and you made a series of snapshots randomly through time. Determine the PDF of the location of the oscillator in the stationary case.
3. Produce 100 random velocities in 3-D which obey the Maxwell-Boltzmann distribution. Suppose that  $kT = 1$ .
4. Suppose that  $x$  has the Pareto distribution,  $p(x) = \frac{a}{x^{a+1}}$  for  $1 \leq x < \infty$ . Find the probability density function of each of the following random variables:

**A** :  $y = x^2$ .

**B** :  $z = \frac{1}{x}$ .

**C** :  $T = \ln(x)$ .

Good luck, Movahed

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