In the name of God

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COMPUTATIONAL PHYSICS

Exercise Set 4

(Date Due: 1395/01/20)

1. Compute mean and variance of position of Random-walk in 1-dimension. To this end suppose:
   A: $P(s) = P^+\delta_D(s-l) + P^-\delta_D(s+l)$ and determine various values for P^+.
   B: $P(s) = \frac{1}{\sqrt{2\pi\sigma^2}}\exp\left(-\frac{s^2}{2\sigma^2}\right)$.

2. Simulate a particle based on Langevin equation. Compute:
   A: $\langle v(t) \rangle$.
   B: $\langle v(t)^2 \rangle$.
   C: $\langle v(t_1)v(t_2) \rangle$.
   D: $\langle x(t) \rangle$.
   E: $\langle x(t)^2 \rangle$.
   F: $\langle x(t_1)x(t_2) \rangle$.
   G: $p(v)$.
   H: Compare all of above parts with theoretical predictions.

Good luck, Movahed