HW #1

1. Consider a 1D diffusion process with constant diffusion coefficient D and no drift. If at t=0 all particles are located at the origin [i.e., $C(x,0) = N\delta(x)$, where N is the total # of particles and $c(x,t)$ is the particle concentration] Find $C(x,t)$ at later times $t>0$ by solving the diffusion equation.

2. In a model of Brownian motion in a harmonic oscillator heat bath discussed in class (Zwanzig, section 1.6), show that

$$\langle F_p(t) F_p(t') \rangle = k_B T \, K(t-t').$$

3. Reading assignment:

[Maruyama et al. Rev. Mod Phys. 81, 2009, 1-23

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