# Problem (3-4)

## Problem 3

0.0/2.0 points (graded)

Consider the Langevin equation (Eq.(21)) in the overdamped limit $(m \to 0)$. Calculate the power spectrum of the particle velocity $S_V(\omega)$ and choose the correct result from the following choices.

- $S_V(\omega) = 6\tilde{D}$
- $S_V(\omega) = \frac{6\tilde{D}}{\zeta^2}$
- $S_V(\omega) = \frac{6\tilde{D}}{\omega^2+\zeta^2}$
- $S_V(\omega) = 6\tilde{D}\delta(t)$
- $S_V(\omega) = \frac{6\tilde{D}}{\zeta^2}\delta(t)$
- $S_V(\omega) = \frac{6\tilde{D}}{\omega^2+\zeta^2}\delta(t)$

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## Problem 4

0.0/2.0 points (graded)

Consider the Langevin equation (Eq.(21)) in the overdamped limit $(m \to 0)$.

Calculate the velocity auto-correlation function $\varphi_V(t)$ and choose the correct result from the following choices.

- $\varphi_V(t) = \frac{3\tilde{D}}{\zeta^2}$
- $\varphi_V(t) = \frac{6\tilde{D}}{\zeta^2}$
- $\varphi_V(t) = \frac{3\tilde{D}}{\zeta m}$
- $\varphi_V(t) = \frac{3\tilde{D}}{\zeta^2}\delta(t)$
- $\varphi_V(t) = \frac{6\tilde{D}}{\zeta^2}\delta(t)$
- $\varphi_V(t) = \frac{3\tilde{D}}{\zeta m}\delta(t)$

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