



Brownian motion 2: computer

Course > Week 4 > simulation

> Problem (1)

## Problem (1)

### Problem 1

0.0/2.0 points (graded)

The random forces  $\mathbf{F} = (F_x, F_y, F_z)$  appearing in the Langevin equation are assumed to be described by a white noise process. As such, they need to satisfy Eq.(F4)

$$\langle \mathbf{F}(t) \mathbf{F}(0) \rangle = 2k_B T \zeta \mathbf{I} \delta(t) \quad (\text{F4})$$

Choose the mathematically equivalent expression(s) to Eq.(F4) from the following equations.

$$\langle \mathbf{F}(t) \cdot \mathbf{F}(0) \rangle = 2k_B T \zeta \delta(t) \quad (\text{FH1})$$

$$\langle \mathbf{F}(t) \mathbf{F}(0) \rangle = \begin{pmatrix} 2k_B T \zeta \delta(t) & 0 & 0 \\ 0 & 2k_B T \zeta \delta(t) & 0 \\ 0 & 0 & 2k_B T \zeta \delta(t) \end{pmatrix} \quad (\text{FH2})$$

$$\langle \mathbf{F}(t) \cdot \mathbf{F}(0) \rangle = 2k_B T \zeta \delta(t) \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad (\text{FH3})$$

$$\langle \mathbf{F}(t) \mathbf{F}(0) \rangle = \begin{pmatrix} 2k_B T \zeta \delta(t) \\ 2k_B T \zeta \delta(t) \\ 2k_B T \zeta \delta(t) \end{pmatrix} \quad (\text{FH4})$$

☐ Eq.(FH1) only☐ Eq.(FH2) only☐ Eq.(FH3) only☐ Eq.(FH4) only

You have used 0 of 2 attempts

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