

Coupled equations for the mean:

$$\mathbf{L}\langle\Psi\rangle + \mathbf{A}\langle\Psi\eta\rangle + \mathbf{S} = 0,$$

$$\mathbf{L}\langle\Psi\eta\rangle + \mathbf{A}\langle\Psi\eta^2\rangle - r_c\langle\Psi\eta\rangle = 0,$$

$$\begin{aligned} \mathbf{L}\langle\Psi\eta^2\rangle + \mathbf{A}\langle\Psi\eta^3\rangle + \mathbf{S}\langle\eta^2\rangle - \\ - 2r_c(\langle\Psi\eta^2\rangle - \langle\Psi\rangle\langle\eta^2\rangle) = 0. \end{aligned}$$

For small  $r_c = 1/\tau_d$ ,

$$\begin{aligned} \langle\Psi\rangle &= - \int_{-\infty}^{\infty} d\eta p_S(\eta) (\mathbf{L} + \mathbf{A}\eta)^{-1} \mathbf{S} \\ &= - \int_{-\infty}^{\infty} d\eta p_S(\eta) \left[ \mathbf{I} - (\mathbf{L}^{-1}\mathbf{A})^2 \eta^2 \right]^{-1} \mathbf{L}^{-1} \mathbf{S} \end{aligned}$$