

$$\begin{aligned}
& \dot{\delta}(\mathbf{k}, \tau) + \theta(\mathbf{k}, \tau) \\
= & - \int \frac{d^3 k_1}{(2\pi)^3} \int d^3 k_2 \delta_D(\mathbf{k}_1 + \mathbf{k}_2 - \mathbf{k}) \frac{\mathbf{k} \cdot \mathbf{k}_1}{k_1^2} \delta(\mathbf{k}_2, \tau) \theta(\mathbf{k}_1, \tau), \\
& \dot{\theta}(\mathbf{k}, \tau) + \frac{\dot{a}}{a} \theta(\mathbf{k}, \tau) + \frac{3\dot{a}^2}{2a^2} \Omega_{\text{m}}(\tau) \delta(\mathbf{k}, \tau) \\
= & - \int \frac{d^3 k_1}{(2\pi)^3} \int d^3 k_2 \delta_D(\mathbf{k}_1 + \mathbf{k}_2 - \mathbf{k}) \frac{k^2 (\mathbf{k}_1 \cdot \mathbf{k}_2)}{2k_1^2 k_2^2} \theta(\mathbf{k}_1, \tau) \theta(\mathbf{k}_2, \tau)
\end{aligned}$$