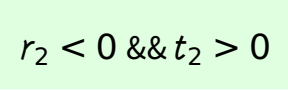


# Wave operator and propagator

$$\begin{aligned}
\text{Quadratic (free) action} \\
S = & \int \int \int \left( \frac{1}{6} f^{\alpha\beta} \tau_{\alpha\beta} + 6 \omega^{\alpha\beta\chi} \sigma_{\alpha\beta\chi} + 4 t_2 \omega_{\theta\alpha} \partial^\theta f^{\alpha\iota} + 2 t_2 \partial_\alpha f_{\iota\theta} \partial^\theta f^{\alpha\iota} - \right. \\
& t_2 \partial_\alpha f_{\theta\iota} \partial^\theta f^{\alpha\iota} - t_2 \partial_\iota f_{\alpha\theta} \partial^\theta f^{\alpha\iota} + t_2 \partial_\theta f_{\alpha\iota} \partial^\theta f^{\alpha\iota} - \\
& t_2 \partial_\theta f_{\iota\alpha} \partial^\theta f^{\alpha\iota} - 4 t_2 \omega_{\alpha\theta\iota} (\omega^{\alpha\iota\theta} + \partial^\theta f^{\alpha\iota}) + \\
& 2 t_2 \omega_{\alpha\iota\theta} (\omega^{\alpha\iota\theta} + 2 \partial^\theta f^{\alpha\iota}) + 8 r_2 \partial_\beta \omega_{\alpha\iota\theta} \partial^\theta \omega^{\alpha\beta\iota} - \\
& 4 r_2 \partial_\beta \omega_{\alpha\theta\iota} \partial^\theta \omega^{\alpha\beta\iota} + 4 r_2 \partial_\beta \omega_{\iota\theta\alpha} \partial^\theta \omega^{\alpha\beta\iota} - \\
& 2 r_2 \partial_\iota \omega_{\alpha\beta\theta} \partial^\theta \omega^{\alpha\beta\iota} + 2 r_2 \partial_\theta \omega_{\alpha\beta\iota} \partial^\theta \omega^{\alpha\beta\iota} - \\
& 4 r_2 \partial_\theta \omega_{\alpha\iota\beta} \partial^\theta \omega^{\alpha\beta\iota} - 12 r_4 \partial_\theta \omega_{\kappa\lambda}^\lambda \partial^\kappa \omega_{\alpha}^{\alpha\theta} - \\
& 12 r_4 \partial_\alpha \omega^{\alpha\theta\kappa} \partial_{\lambda}^\lambda \partial_{\kappa}^\kappa \omega_{\theta}^{\alpha\theta} + 24 r_4 \partial_\alpha \omega_{\kappa}^{\lambda} \partial_{\lambda}^\lambda \omega_{\theta}^{\alpha\theta} - \\
& \left. 24 r_3 \partial_\beta \omega_{\iota\alpha} \partial^\lambda \omega^{\alpha\beta\iota} \right) [t, x, y, z] dz dy dx dt
\end{aligned}$$

## Unitarity conditions



(No massless particles)