Weyl Gauge Matthew

Result After Applying Gauge Condition

Gauge Condition:

$$\bar{\nabla}^{\mu}\bar{K}_{\mu\nu} = 4\Omega^{-1}\bar{K}_{\mu\nu}\bar{\nabla}^{\mu}\Omega \tag{1}$$

$$\begin{aligned}
\delta W_{\mu\nu}(K_{\mu\nu}) &= -48\Omega^{-7}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\alpha}\Omega\nabla_{\beta}\Omega\nabla_{\rho}\Omega\nabla_{\sigma}K_{\mu\nu} + 24\Omega^{-6}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\alpha}\Omega\nabla_{\rho}\nabla_{\beta}\Omega\nabla_{\sigma}K_{\mu\nu} \\
&+ 60\Omega^{-8}g^{\alpha\beta}g^{\rho\sigma}K_{\mu\nu}\nabla_{\alpha}\Omega\nabla_{\beta}\Omega\nabla_{\rho}\Omega\nabla_{\sigma}\Omega - 4\Omega^{-5}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\rho}\nabla_{\alpha}\Omega\nabla_{\sigma}\nabla_{\beta}K_{\mu\nu} \\
&+ 6\Omega^{-6}g^{\alpha\beta}g^{\rho\sigma}K_{\mu\nu}\nabla_{\rho}\nabla_{\alpha}\Omega\nabla_{\sigma}\nabla_{\beta}\Omega + 12\Omega^{-6}g^{\alpha\rho}g^{\beta\sigma}\nabla_{\alpha}\Omega\nabla_{\beta}\Omega\nabla_{\sigma}\nabla_{\rho}K_{\mu\nu} \\
&+ 6\Omega^{-6}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\alpha}\Omega\nabla_{\beta}\Omega\nabla_{\sigma}\nabla_{\rho}K_{\mu\nu} - 2\Omega^{-5}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\beta}\nabla_{\alpha}\Omega\nabla_{\sigma}\nabla_{\rho}K_{\mu\nu} \\
&+ 12\Omega^{-6}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\alpha}\Omega\nabla_{\beta}K_{\mu\nu}\nabla_{\sigma}\nabla_{\rho}\Omega - 48\Omega^{-7}g^{\alpha\rho}g^{\beta\sigma}K_{\mu\nu}\nabla_{\alpha}\Omega\nabla_{\beta}\Omega\nabla_{\sigma}\nabla_{\rho}\Omega \\
&- 24\Omega^{-7}g^{\alpha\beta}g^{\rho\sigma}K_{\mu\nu}\nabla_{\alpha}\Omega\nabla_{\beta}\Omega\nabla_{\sigma}\nabla_{\rho}\Omega + 3\Omega^{-6}g^{\alpha\beta}g^{\rho\sigma}K_{\mu\nu}\nabla_{\beta}\nabla_{\alpha}\Omega\nabla_{\sigma}\nabla_{\rho}\Omega \\
&- 4\Omega^{-5}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\alpha}\Omega\nabla_{\sigma}\nabla_{\rho}\nabla_{\beta}K_{\mu\nu} - 4\Omega^{-5}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\alpha}K_{\mu\nu}\nabla_{\sigma}\nabla_{\rho}\nabla_{\beta}\Omega \\
&+ 12\Omega^{-6}g^{\alpha\beta}g^{\rho\sigma}K_{\mu\nu}\nabla_{\alpha}\Omega\nabla_{\sigma}\nabla_{\rho}\nabla_{\beta}\Omega + \tfrac{1}{2}\Omega^{-4}g^{\alpha\beta}g^{\rho\sigma}\nabla_{\sigma}\nabla_{\rho}\nabla_{\beta}\nabla_{\alpha}K_{\mu\nu} \\
&- \Omega^{-5}g^{\alpha\beta}g^{\rho\sigma}K_{\mu\nu}\nabla_{\sigma}\nabla_{\rho}\nabla_{\beta}\nabla_{\alpha}\Omega \\
&= \frac{1}{2}\Omega^{-2}g^{\sigma\rho}g^{\alpha\beta}\nabla_{\sigma}\nabla_{\rho}\nabla_{\alpha}\nabla_{\beta}(\Omega^{-2}K_{\mu\nu})
\end{aligned} \tag{2}$$