Schutz 8.12

$$h_{\alpha\beta} \rightarrow h_{\alpha\beta}^{(new)} = h_{\alpha\beta} - \xi_{\alpha,\beta} - \xi_{\beta,\alpha}$$

$$\overline{h}_{\alpha\beta}^{(new)} = h_{\alpha\beta}^{(new)} - \frac{1}{2}\eta_{\alpha\beta}h^{(new)}$$

$$= h_{\alpha\beta} - \xi_{\alpha,\beta} - \xi_{\beta,\alpha} - \frac{1}{2}\eta_{\alpha\beta}\left[h^{\mu}_{\mu} - 2\xi^{\mu}_{,\mu}\right]$$

$$= h_{\alpha\beta} - \frac{1}{2}\eta_{\alpha\beta}h^{\mu}_{\mu} - \xi_{\alpha,\beta} - \xi_{\beta,\alpha} + \eta_{\alpha\beta}\xi^{\mu}_{,\mu}$$

$$= \boxed{\overline{h}_{\alpha\beta} - \xi_{\alpha,\beta} - \xi_{\beta,\alpha} + \eta_{\alpha\beta}\xi^{\mu}_{,\mu}}$$

Davidson Che

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