Exercise Set 5

Sean Ericson

Phys 632

February 15, 2022

Exercise 1

It works!

Exercise 2

$$
\begin{aligned}
M_{\alpha\beta} &= \frac{1}{3}M^{(0)}\delta_{\alpha\beta} + \frac{1}{4}M_\mu^{(1)}\epsilon_{\mu\alpha\beta} + M_{\alpha\beta}^{(2)} \\
&= \frac{1}{3}M_{\mu\mu}\delta_{\alpha\beta} + \frac{1}{4}\epsilon_{\mu\sigma\tau}(M_{\sigma\tau} - M_{\tau\sigma})\epsilon_{\mu\alpha\beta} + \frac{1}{2}(M_{\alpha\beta} + M_{\beta\alpha}) - \frac{1}{3}M_{\mu\mu}\delta_{\alpha\beta} \\
&= \frac{1}{4}(\delta_{\alpha\sigma}\delta_{\beta\tau} - \delta_{\alpha\tau}\delta_{\beta\sigma})(M_{\sigma\tau} - M_{\tau\sigma}) + \frac{1}{2}(M_{\alpha\beta} + M_{\beta\alpha}) \\
&= \frac{1}{4}(M_{\alpha\beta} - M_{\beta\alpha} - M_{\beta\alpha} + M_{\alpha\beta}) + \frac{1}{2}(M_{\alpha\beta} + M_{\beta\alpha}) \\
&= M_{\alpha\beta}
\end{aligned}
$$