$$\left\langle \theta \left| \mathcal{N} \right| N^{\theta}(\underline{p}, s) \right\rangle = \mathcal{Z}_N(\theta; \underline{p}) u_N^{\theta}(\underline{p}, s) = \mathcal{Z}_N(\theta; \underline{p})\, \mathrm{e}^{i\alpha_N(\theta)\gamma_5} u_N(\underline{p}, s)$$