Problems 48-50

48. Show that $\nabla_a \perp^c_b = -s_b K_a{}^c - s_a s_b a^c - s^c K_{ab} - s^c s_a a_b$.

49. Show that $\perp \nabla_a \nabla_b s_c = \varepsilon D_a K_{bc} + a_c K_{ab}$.

50. Show that $s^a \mathcal{L}_{\bar{s}} K_{ab} = 0$ and therefore $\perp \mathcal{L}_{\bar{s}} K_{ab} = \mathcal{L}_{\bar{s}} K_{ab}$.