Notes KK(0)

$$D\wedge(D\wedge T^a)$$

$$= D_\sigma D_\mu T^a_{\nu\rho} + D_\mu D_\nu T^a_{\rho\sigma} + D_\rho D_\sigma T^a_{\mu\nu} + D_\nu D_\rho T^a_{\sigma\mu}$$
$$+ D_\sigma D_\nu T^a_{\rho\mu} + D_\mu D_\sigma T^a_{\nu\rho} + D_\rho D_\mu T^a_{\sigma\nu} + D_\nu D_\rho T^a_{\mu\sigma}$$
$$+ D_\sigma D_\rho T^a_{\mu\nu} + D_\nu D_\sigma T^a_{\rho\mu} + D_\mu D_\nu T^a_{\sigma\rho} + D_\rho D_\mu T^a_{\nu\sigma}$$

$$= D_\sigma\left(D_\mu T^a_{\nu\rho} + D_\nu T^a_{\rho\mu} + D_\rho T^a_{\mu\nu}\right) \checkmark\checkmark$$
$$+ D_\rho D_\sigma T^a_{\mu\nu} + D_\mu D_\sigma T^a_{\nu\rho} + D_\nu D_\sigma T^a_{\rho\mu}$$

$$= D(D\wedge T^a) + \cdots$$

$$D\wedge R^a = D_\rho D_\sigma T^a_{\mu\nu} + D_\mu D_\sigma T^a_{\nu\rho} + D_\nu D_\sigma T^a_{\rho\mu}$$

$$= e^b_\sigma\left(D_\rho R^a{}_{b\mu\nu} + D_\mu R^a{}_{b\nu\rho} + D_\nu R^a{}_{b\rho\mu}\right)$$

$$D_\sigma T^a_{\mu\nu} = e^b_\sigma R^a{}_{b\mu\nu} = R^a{}_{\sigma\mu\nu}$$

$$D_\sigma T^a_{\nu\rho} = e^b_\sigma R^a{}_{b\nu\rho} = R^a{}_{\sigma\nu\rho}$$

$$D_\sigma T^a_{\rho\mu} = e^b_\sigma R^a{}_{b\rho\mu} = R^a{}_{\sigma\rho\mu}$$

Riemann tensor or form can always be replaced by Torsion tensor or form.