$$+ \nabla^\perp_{[X,Y]}\eta - A_\eta[X,Y]$$

(tangential)

$$= R^\perp(X,Y)\eta - A_{\nabla^\perp_X \eta}Y - \nabla_Y A_\eta X - \alpha(A_\eta X, Y)$$
$$+ A_{\nabla^\perp_Y \eta}X + \nabla_X A_\eta Y - A_\eta[X,Y]$$
$$+ \alpha(A_\eta Y, X)$$

$$\bar{R}(X,Y,\eta,\xi) = R^\perp(X,Y,\eta,\xi) - \bar{g}(\alpha(A_\eta X, Y), \xi)$$
$$+ \bar{g}(\alpha(A_\eta Y, X), \xi)$$

$$= R^\perp(X,Y,\eta,\xi) - \bar{g}(A_\xi(A_\eta X), Y)$$
$$+ \bar{g}(A_\xi(A_\eta Y), X)$$

$$= R^\perp(X,Y,\eta,\xi) - \bar{g}(A_\xi \circ A_\eta X, Y)$$
$$+ \bar{g}(A_\eta \circ A_\xi X, Y)$$

#

Def If $R^\perp = 0$, then the immersion is normal flat.

If $\bar{M}$ has constant sectional curvature, then $\bar{R}(X,Y,Z,\xi) = 0$ (only $R_{ijij} \neq 0$, $i \neq j$; $R_{ijst} = 0$)

$R^\perp = 0$ iff $[A_\eta, A_\xi] = 0$

i.e. iff $\exists$ basis in T_pM, which diagonalize A_η simultaneously, $\forall \eta$