Gray identities and the Tanaka-Webster connection

Raluca Mocanu

We recall the Gray curvature identities for an almost Hermitian manifold (M, g, J), introduced by Alfred Gray in 1976,

$$R(X, Y, Z, W) = R(X, Y, JZ, JW)$$

$$R(X, Y, Z, W) = R(JX, Y, Z, JW) + R(X, JY, Z, JW) + R(X, Y, JZ, JW)$$

$$R(X, Y, Z, W) = R(JX, JY, JZ, JW)$$

Consider a contact manifold $(M, g, \varphi, \xi, \eta)$ endowed with the generalized Tanaka-Webster connection. We give Gray-type curvature identities for these manifolds, compare their properties with those of Gray identities for almost contact and contact manifolds endowed with the Levi-Civita connection.