

New integral formulae for two complementary orthogonal distributions on Riemannian manifolds

We consider two complementary orthogonal distributions on a Riemannian manifold, their second fundamental forms A_1 , A_2 and mean curvature vectors H_1 , H_2 . We calculate the divergence of the sum

$$\operatorname{div}(A_1(H_2, H_1) + A_2(H_1, H_2))$$

and we obtain a new series of integral formulae for Riemannian manifold. Using the Stokes theorem we arrive at an integral formula which generalizes some of the known formulae for codimension one foliations and distributions due to K. Andrzejewski, F. Brito, R. Langevin, H. Rossenberg, V. Rovenski and P. Walczak. We apply our formulae to some particular cases of distributions (foliations, for example totally umbilical ones). We consider the situation of manifold with boundary and distributions (foliations) with singular points.