

ON 3-DIMENSIONAL $\tilde{\mathcal{J}}$ -TANGENT CENTRO-AFFINE HYPERSURFACES WITH NULL-DIRECTIONS

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ABSTRACT. In this talk we study 3-dimensional centro-affine hypersurfaces with a $\tilde{\mathcal{J}}$ -tangent centro-affine vector field ($\tilde{\mathcal{J}}$ is the canonical para-complex structure on \mathbb{R}^4) with the property that at least one null-direction of the second fundamental form coincides with either \mathcal{D}^+ or \mathcal{D}^- ($\mathcal{D} = \mathcal{D}^+ \oplus \mathcal{D}^-$). Here \mathcal{D} is the biggest $\tilde{\mathcal{J}}$ -invariant distribution in TM and \mathcal{D}^+ , \mathcal{D}^- are eigen spaces related to eigen values $+1$ and -1 respectively. We give a full local classification of such hypersurfaces. Moreover we classify 3-dimensional $\tilde{\mathcal{J}}$ -tangent affine hyperspheres with the above properties. In particular, we show that every nondegenerate centro-affine hypersurface of dimension 3 with a $\tilde{\mathcal{J}}$ -tangent centro-affine vector field which has two null-directions \mathcal{D}^+ and \mathcal{D}^- must be both an affine hypersphere and a hyperquadric. We provide also some examples.

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