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Title of the Thesis: **Study on Some Submanifolds of Differentiable Manifolds**
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ABSTRACT

The present doctoral thesis is a collection of research works done on the studies of various types of submanifolds of some differentiable manifolds. Most of those works are already published in various reputed national and international journals at different times. This thesis consists of seven chapters.

In the **Introduction** chapter, we have explained the background of the works and the main results at which we have arrived in the following sections.

In the **second chapter**, we have discussed about anti-invariant submanifolds of indefinite Sasakian manifold, indefinite Kenmotsu manifold, indefinite trans-Sasakian manifold, indefinite LP-Sasakian manifold and have obtained some results regarding the relation between the structure vector field of a manifold and the anti-invariance of the submanifold. Also we have obtained some results on totally umbilical, totally geodesic submanifolds.

In the **third chapter**, we have discussed *-η-Ricci-Yamabe solitons on anti-invariant submanifolds of Kenmotsu manifold with respect to a quarter symmetric metric connection and contact CR-submanifolds of trans-Sasakian manifolds with respect to a quarter symmetric non-metric connection. We have also given an example of a 3-dimensional Kenmotsu manifold admitting a *-η-Ricci-Yamabe soliton and an example of a 3-dimensional trans-Sasakian manifold admitting a quarter symmetric non-metric connection to verify respective relations.

In the **fourth chapter**, we have analysed briefly some properties of a hemi-slant submanifold of an $(LCS)_n$-manifold. We have discussed about some necessary and sufficient (n & s) conditions for distributions to be integrable and have also studied the geometry of leaves. At last, we have constructed a suitable example.

In the **fifth chapter**, we have discussed quasi hemi-slant (QHS) submanifolds of trans-Sasakian manifolds and then, we have introduced the general notion of such submanifolds in metallic Riemannian manifolds. We have obtained n & s conditions for integrability of the distributions, for these distributions to define totally geodesic foliations, for a QHS submanifold of a trans-Sasakian manifold to be a locally product Riemannian manifold, and also for a submanifold to be QHS in metallic and golden Riemannian manifolds. At last, we have constructed an example of a QHS submanifold of a trans-Sasakian manifold as well as of a metallic Riemannian manifold.

In the **sixth chapter**, we have studied screen-slant lightlike submanifolds, totally contact umbilical screen-slant lightlike submanifolds, totally contact umbilical radical screen-transversal lightlike submanifolds, contact screen generic lightlike (CSGL) submanifolds, totally umbilical CSGL submanifolds and minimal CSGL submanifolds of indefinite Kenmotsu manifold. We have also constructed an example of a CSGL submanifold of an indefinite Kenmotsu manifold.

In the **seventh chapter**, we have dealt with the study of anti-invariant submanifolds of trans-Sasakian manifold with respect to Zamkovoy connection. We have discussed the nature of Ricci flat, concircularly flat, ξ-projectively flat, M-projectively flat, ξ-M-projectively flat, pseudo projectively flat and ξ-pseudo projectively flat anti-invariant submanifolds of trans-Sasakian manifold admitting Zamkovoy connection. Further, we have studied Ricci soliton along with η-Ricci-Yamabe soliton and two more solitons arose as its particular cases on some of the aforesaid submanifolds. At last, we have made some conclusions and have provided an example of an anti-invariant submanifold of a trans-Sasakian manifold.

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