

## A Mathematical Study of Recurrent-Vector Field in a Kaehlerian Space

Rajeev Kumar Singh and Maninder Singh Arora\*,  
Department of Mathematics,  
P.B.P.G. College, Pratapgarh (U.P.) India  
E-mail: profrajeevsingh@gmail.com  
\*Department of Mathematics,  
P.P.N. College, Kanpur (U.P.) India  
E-mail: maninder\_arora4@rediffmail.com

**Abstract:** In this paper we have discussed about recurrent vector field  $V^h$  with respect to complex conformal connection  $\Gamma_{ji}^h$ . Also we have obtained results about a vector field recurrent with respect to special semi-symmetric metric F-connection.

**Keywords and phrases:** Recurrent vector field, complex conformal connection.

### 1. Introduction

Various connections like conformal complex connections, special semi-symmetric metric F-connections, besides the well known Christoffel symbols are introduced and studies by several mathematicians. We have mentioned the basic result and the covariant derivatives of a vector field with respect to them are shown to be connected. We have discussed the most general analytic k-torse forming vectors existing in Kaehlerian spaces. We have devoted to the study of parallel and recurrent vector fields in Kaehlerian space.

In real 2n-dimensional Kaehlerian space with  $F_i^h$  as structure tensor and  $g_{ji}$  as Hermitian metric, several connection parameters other than the Christoffel symbols are known. Since structure tensor is covariant with respect of  $\left\{ \begin{matrix} h \\ ij \end{matrix} \right\}$ , all these connections  $\Gamma_{ji}^h$  with respect to whom the covariant derivatives of structure tensor vanishes identically are called F-connection.

A connection parameter having  $\Gamma_{ji}^h$  as its components given by

$$\Gamma_{ji}^h = \left\{ \begin{matrix} h \\ ij \end{matrix} \right\} + \delta_j^h p_i + \delta_i^h p_j - g_{ji} p^h + F_j^h q_i - F_{ji}^h q^h$$

where  $p_i = \partial_{ip}$ ,  $p^h = g^{th} p_t$ ,  $q_i = -p_t F_i^t$ ,  $q^h = -q_t g^{th}$  and P is some scalar point function, has been called complex conformal connection.

### 2. Recurrent Field