

## On Cartan connexions and their torsions

By

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### Introduction

In recent years, the general theory of connexions on differentiable fibre bundles has been developed by many authors. The purpose of this paper is to investigate on the structure of Cartan connexion and some facts related with it. One of the useful notions introduced in § 1 is the tensorial form on a principal fibre bundle. In § 2, we define the basic tensorial form of the soldered structure of bundle, and making its use we give expositions of Cartan connexions. The last section is concerned with the torsion forms of Cartan connexions. I think that the underlying principle of the tensor calculus for general Cartan connexion has been made clear through these debates.

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### § 1. Preliminaries and notations

1. Throughout this paper we shall denote by  $T(X)$  and by  $T_x(X)$  the tangent vector bundle over any differentiable manifold  $X$  and the tangent vector space of  $X$  at a point  $x \in X$  respectively. Any differentiable mapping  $\varphi$  of  $X$  into another differentiable manifold  $X'$  induces a linear mapping  $\varphi^* : T_x(X) \rightarrow T_{x'}(X')$ , where  $x' = \varphi(x)$ .

Let  $\mathcal{B}(M, Y, G, \pi)$  be a differentiable fibre bundle, where  $M$ ,  $Y$ ,  $G$ , and  $\pi$  denote respectively the base space, the fibre, the structure

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1), 2) Cf. [10] pp. 37~39. The number in the bracket refers to the bibliography at the end of the paper.