On soudures of differentiable fibre bundles

Dedicated to Prof. Y. Akizuki on his 60th birthday

By

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Introduction

In the differential geometry, the notion of a tangent space bundle which may be defined by a soudure structure palys an important rôle.

In this paper, we consider some geometric structures closely related to the soudure, and research into their existences. In §2, considering extensions of linear maps of vector bundles, we make preparations for the later sections. Moreover, we need some results on connections and on extensions of tensorial forms described respectively in §4 and in §5. We introduce in §6 the notion of a (G, ρ)-structure and its structure tensor. A soudure may be regarded as a special case of (G, ρ)-structures. Combining a connection and a soudure under a suitable conditon, we get the notion of a Cartan connection. In the last section, we make remarks on the Cartan structure tensor of a soudure.

It will be shown that the obstruction classes of the existences of such structures in the complex analytic case may be represented by differential forms through the theorem of Dolbeault.

§1. Fibre bundles

Throughout this paper, we assume that any differentiable manifold is paracompact, and that any fibre bundle is of class C^{∞} or complex analytic.

Let $P(M, G)$ be a *principal G-bundle* over M with projecton