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On deformations of cross-sections of a differentiable fibre bundle

By

Toshimasa YAGYU

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Introduction

It is well-known that geometric structures on a topological space can be defined mostly through the notion of (B, Γ)-structure, where Γ is a pseudogroup of local homeomorphisms of a topological space B. Particularly for a differentiable manifold, when we take the euclidean space R^n as B and some pseudogroup Γ_d of local differentiable transformations of R^n as Γ, (R^n, Γ_d)-structures are objects of differential geometry. On the other hand, there are also structures defined by cross-sections of differentiable bundles over a differentiable manifold such as Riemannian metric structures. But they are not considered generally as (R^n, Γ_d)-structures. However if we take the space of germs of cross-sections of the product bundle over R^n as B and a suitable pseudogroup on it as Γ, we can regard the structures by cross-sections of the differentiable fibre bundle as (B, Γ)-structures. (§ 5.)

D. C. Spencer ([10]) has pointed out without proof that the set of germs of m-parameter deformations of a (B, Γ)-structure may be identified with a 1-cohomology set with coefficients on some sheaf, from the theory of A. Haefliger ([8]). Hence, we can apply this theory to deformations of a cross-section and we have a theorem on deformations of a Riemannian manifold as an example.

We give a direct formulation and proof of Spencer's proposition without such a objectionable condition for our application, that B is paracompact. Though our result (Theorem 3) can be