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First Variation Formulas for a Witten Type Functional (II)

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Abstract : The aim of this article is to give some more properties of the Euler-Lagrange equations which are given in Part I ([22]). We consider as well the special case of positive scalar curvature. The formula of the Hessian at a critical point is given in [23]. The definitions related to vector bundles and connections can be found in [4], [6] (see page 54 for fibre bundles associated with a given principal bundle and a left action of its structure group on a fixed manifold). The general definitions of the Lie groups $Spin^G(n)$ ($n \in \mathbb{N}^*$), of $Spin^G(n)$-structures in $SO(n)$-principal bundles and of associated Seiberg-Witten monopole equations (for $SO(4)$-coframes bundles) have been introduced and studied in [16] and [18] (page 509 for the definitions). We refer here only to the $n = 3$ case. More details about $Spin^G(3)$-structures and the associated Weitzenböck formula can be found in [21].

Key words and phrases : spinor, connection, curvature, Dirac operator, critical points.

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