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Leaf-wise Harmonic Maps of Manifolds with 2-dimensional Foliations

In the 1980s, A. Connes [Proc. of Symp. in Pure Math, AMS, 1982] and E. Ghys [J. Func. Anal., 1988] proved the Gauss-Bonnet type theorem for compact manifolds with 2-dimensional foliations. In this paper, we derive the expressions of harmonic non \pm holomorphic maps of Riemann surfaces. We study the relationship between leaf-wise harmonic maps and harmonic maps. We investigate the Gauss-Bonnet type theorem for leaf-wise harmonic maps between manifolds with 2-dimensional foliations, which generalize the results of Connes and Ghys. This paper has recently appeared in the Bulletin of the Institute of Mathematics, Academia, Sinica.