Stability of generalized P-harmonic maps

AHMED MOHAMMED CHERIF[1]

ABSTRACT. In this paper, we prove that any stable $P(x)$-harmonic map ψ from $\mathbb{S}^2$ to N is a holomorphic or anti-holomorphic map, where N is a Kählerian manifold with non-positive holomorphic bisectional curvature and $P(x) \geq 2$ is a smooth function on the sphere $\mathbb{S}^2$ satisfying some condition. We study the existence of stable $P(x)$-harmonic map ψ from sphere $\mathbb{S}^n$ ($n > 2$) to Riemannian manifold N, and the stability of $P(x)$-harmonic identity. We also study the case of a product $\mathbb{S}^{n_1} \times ... \times \mathbb{S}^{n_k}$.

REFERENCES

[1] Baird, P.; Wood, J. C. *Harmonic morphisms between Riemannain manifolds*. Clarendon Press, Oxford, 2003.
[2] Baird, P.; Gudmundsson, S. p-harmonic maps and minimal submanifolds. *Math. Ann.* **294** (1992), no. 4, 611-624.
[3] Bojarski, B.; Iwaniec, T. p-harmonic equation and quasiregular mappings. *Banach Center Publ.* **19** (1987), no. 1, 25-38.
[4] Cheung, L-F.; Leung, P-F. Some results on stable p-harmonic maps. *Glasgow Math. J.* **36** (1994), no. 1, 77-80.
[5] Djaa, M.; Mohammed Cherif, A. On generalized f-harmonic maps and liouville type theorem. *Konuralp J. Math.* **4** (2016), no. 1, 33-44.
[6] Eells, J.; Sampson, J. H. Harmonic mappings of Riemannian manifolds. *Amer. J. Math.* **86** (1964), 109-160.
[7] Fardoun, A. On equivariant p-harmonic maps. *Ann. Inst. H. Poincaré C Anal. Non Linéaire* **15** (1998), no. 1, 25-72.
[8] Leung, P. F. A note on stable harmonic maps. *J. London Math. Soc.* **29** (1984), no. 2, 380-384.
[9] Masuoka, R. On the stability of Riemannian manifolds. *J. Math. Soc. Japan* **41** (1989), no. 3, 493-501.
[10] Merdji, B.; Mohammed Cherif, A. On the Generalized of p-harmonic Maps. *Int. Electron. J. Geom.* **15** (2022), no. 2, 183-191.
[11] Mohammed Cherif, A.; Djaa, M.; Zegga, K. Stable f-harmonic maps on sphere. *Commun. Korean Math. Soc.* **30** (2015), no. 4, 471-479.
[12] Mohammed Cherif, A. On the p-harmonic and p-biharmonic maps. *J. Geom.* **109** (2018), no. 41, 11 pp.
[13] Nagano, T.; Sumi, M. Stability of p-harmonic maps. *Tokyo J. Math.* **15** (1992), no. 2, 475-482.
[14] Rimoldi, M.; Veronelli, G. f-Harmonic Maps and Applications to Gradient Ricci Solitons. arXiv:1112.3637 (2011).
[15] Siu, Y. T.; Yau, S. T. Compact Kähler manifolds of positive bisectional curvature. *Invent. Math.* **59** (1980), no. 2, 189-204.
[16] Xin, Y. L. Some results on stable harmonic maps. *Duke Math. J.* **47** (1980), no. 3, 609-613.
[17] Xin, Y. L. *Geometry of harmonic maps*. Fudan University, 1996.
[18] Yano, K. On harmonic and Killing vector fields. *Ann. of Math.* **55** (1952), no. 2, 38-45.

[1] DEPARTMENT MATHEMATICS, UNIVERSITY OF MASCARA, MASCARA 29000, ALGERIA
Email address: `a.mohammedcherif@univ-mascara.dz`