

Title: On the study of a class of non-linear differential equations on compact Riemannian manifolds

Author(s): Carlos R. Silva, Romildo Pina and Marcelo Souza

We study the existence of solutions of the non-linear differential equations on the compact Riemannian manifolds (M^n, g) , $n \geq 2$,

$$\Delta_p u + a(x)u^{p-1} = \lambda f(u, x), \quad (1)$$

where Δ_p is the p -Laplacian, with $1 < p < n$. Equation (1) generalizes an equation considered by AUBIN [2], where he has considered a compact Riemannian manifold (M, g) , the differential equation ($p = 2$)

$$\Delta u + a(x)u = \lambda f(u, x), \quad (2)$$

where $a(x)$ is a C^∞ function defined on M , and $f(u, x)$ is a C^∞ function defined on $\mathbb{R} \times M$. We show that equation (1) has solution (λ, u) , where $\lambda \in \mathbb{R}$, $u \geq 0$, $u \not\equiv 0$ is a function $C^{1,\alpha}$, $0 < \alpha < 1$, if $f \in C^\infty$ satisfies some growth and parity conditions.

Address:

Carlos R. Silva
Instituto de Ciências Exatas e da Terra
Campus Universitário do Araguaia
Universidade Federal de Mato Grosso
78698-000, Pontal do Araguaia, MT
Brazil

Address:

Romildo Pina
Instituto de Matemática e Estatística
Universidade Federal de Goiás – UFG
74690-900, Goiânia, GO
Brazil

Address:

Marcelo Souza
Instituto de Matemática e Estatística
Universidade Federal de Goiás – UFG
74690-900, Goiânia, GO
Brazil