

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

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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  $\Delta_p$  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  $C^\infty$  function defined on  $M$ , and  $f(u, x)$  is a  $C^\infty$  function defined on  $\mathbb{R} \times M$ . We show that equation (1) has solution  $(\lambda, u)$ , 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.

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