WENLU - Workshop on Nonlinear Partial Differential Equations and Geometric Analysis UFPB - Universidade Federal da Paraíba João Pessoa - Brazil, February 20-24, 2018

HARDY TYPE INEQUALITY AND SUPERCRITICAL WEIGHTED SOBOLEV INEQUALITIES

JOSÉ FRANCISCO DE OLIVEIRA *

In this talk we give improvements to Hardy-type inequalities on weighted Sobolev spaces. Precisely, we investigate suitable conditions to

$$S_{\varphi} = \sup\left\{\int_0^R r^{\theta} |u|^{\varphi(r)} \mathrm{d}r \mid \ u \in AC_{loc}(0, R], \ u(R) = 0 \text{ and } \int_0^R r^{\alpha} |u'|^p \mathrm{d}r = 1\right\} < +\infty$$

where $R, \alpha, \theta > 0, p \ge 1$ are real numbers, $\varphi(r) = p^* + r^{\sigma}$, with $\sigma > 0$ and p^* is the critical exponent $p^* = \frac{\theta+1}{\alpha-p+1}$, for $\alpha - p + 1 > 0$. The above supremum can be associated with an weighted Sobolev space which is a powerful tool to study a class of semilinear elliptic equations including Laplace, *p*-Laplace and *k*-Hessian operators.

^{*}Department of Mathematics, Federal University of Piauí, email: jfoliveira@ufpi.edu.br