

WEIGHTED HARDY'S INEQUALITIES AND APPLICATIONS TO SINGULAR PARABOLIC PROBLEMS

ABDELAZIZ RHANDI

ABSTRACT. In this talk we prove general weighted Hardy's inequalities of the following type:

$$c_{0,\mu} \int_{\mathbb{R}^N} \frac{\varphi^2}{|x|^2} d\mu \leq \int_{\mathbb{R}^N} |\nabla\varphi|^2 d\mu + C \int_{\mathbb{R}^N} \varphi^2 d\mu, \quad \varphi \in C_c^\infty(\mathbb{R}^N), N \geq 3,$$

where μ is a probability measure satisfying appropriate conditions. Moreover, we study the optimality of the constant $c_{0,\mu}$ and apply this to the study of existence and nonexistence of positive solutions to the singular parabolic problem:

$$\begin{cases} \partial_t u = \Delta u + \frac{\nabla\mu}{|\mu|} \cdot \nabla u + \frac{c}{|x|^2} u \\ u(0) = f \in L^2(\mathbb{R}^N, \mu). \end{cases}$$

DEPT. OF INFORMATION ENG., ELECTRICAL ENG. AND APPLIED MATHEMATICS, UNIVERSITY OF SALERNO, ITALY

E-mail address: arhandi@unisa.it