

A $p(x)$ -Laplacian Extension of the Díaz-Saa Inequality and Some Applications

Peter TAKÁČ

Institut für Mathematik, Universität Rostock

Ulmenstraße 69, Haus 3

D-18055 Rostock, Germany

`peter.takac@uni-rostock.de`

October 12, 2017

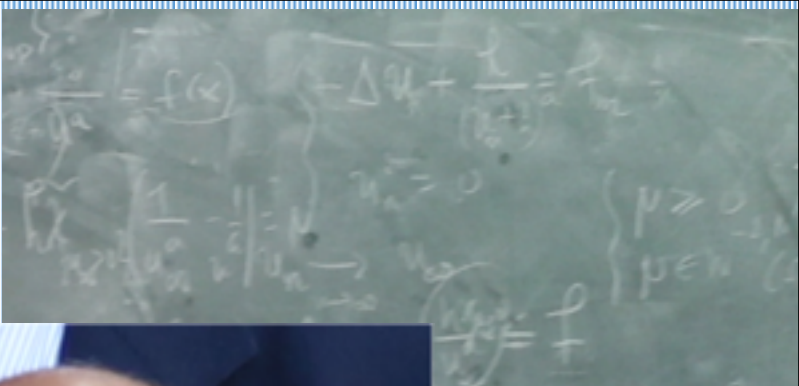
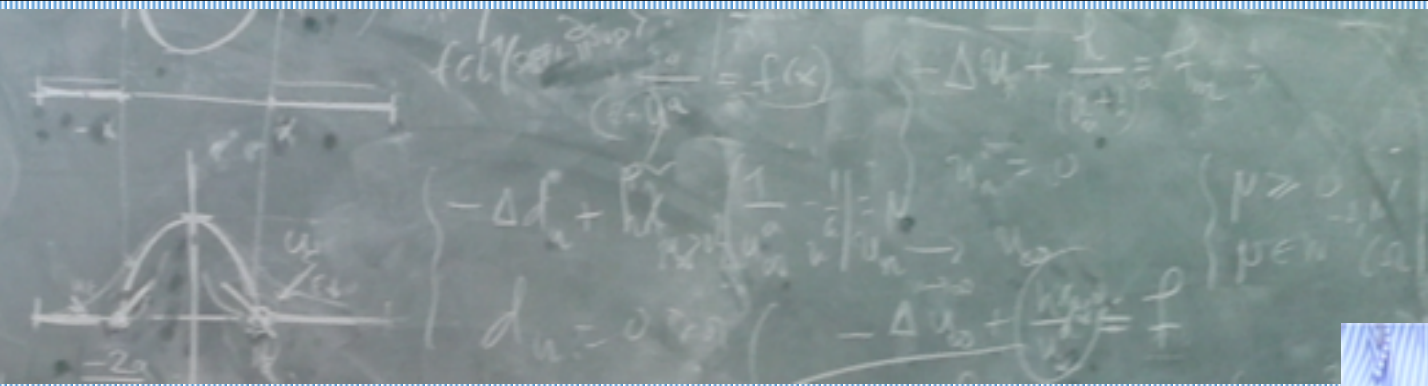
Abstract

The main result of this work is a new extension of the well-known inequality by Díaz and Saa which, in our case, involves an anisotropic operator, such as the $p(x)$ -Laplacian, $\Delta_{p(x)}u \equiv \operatorname{div}(|\nabla u|^{p(x)-2}\nabla u)$. Our present extension of this inequality enables us to establish several new results on the uniqueness of solutions and comparison principles for some anisotropic quasilinear elliptic equations. Our proofs take advantage of certain convexity properties of the energy functional associated with the $p(x)$ -Laplacian.

Running head: Díaz and Saa Inequality for $\Delta_{p(x)}$

Keywords: $p(x)$ -Laplacian;
quasilinear Dirichlet problem with variable exponents;
ray-strictly convex energy functional;
uniqueness and comparison principles

2000 Mathematics Subject Classification: Primary 35J62, 35J92;
Secondary 35B09, 35A02



Nonlinear Partial Differential Equations and Mathematical Analysis:

*A workshop in the honor of
Jean Michel Rakotoson for his 60th
birthday*

Speakers:

F. Abergel, A.C. Casal, J.I. Díaz, A. El Hamidi, A. Fiorenza, D. Gómez-Castro J. Hernández, M. Marion, A. Mercaldo, J.F. Padial, M. Seoane, T. Shaposhnikova, P. Takac, J.I. Tello, L. Tello.

Madrid, December 18th, 2017
Facultad CC. Matemáticas, UCM



UNIVERSIDAD
COMPLUTENSE
MADRID



Instituto de
Matemática
Interdisciplinar

Contact: jidiaz@ucm.es