ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

8. Analysis

1991 MS Classification: 46, 26

Hurri-Syrjanen, Ritva, University of Helsinki, Finland

Generalizations of Poincaré inequality

We show that the following inequality holds in a large class of irregular domains D in R^n

$$\int_D F\left(b\frac{|u(x)-u_D|}{diam(D)}\right)dx \leq K\int_D F(|\nabla u(x)|)\,dx\,,$$

where $F:[0,\infty)\to[0,\infty)$ is a continuous, convex function with $F(0)=0$, and u is a function from an appropriate Sobolev class. Constants b and K depend at most on D. Thus, we generalize certain known results of the ordinary Poincaré inequality, it is the case $F(x)=x^p$, $p\in[1,\infty)$. On the other hand we show that there are other domains than smooth domains which satisfy the above generalized inequality. The inequality has applications to the regularity of minimizers of integral functionals with nonstandard growth.