DESCRIPTION FOR THE GENERAL PUBLIC

Nonlinear differential problems
in generalised Sobolev and Orlicz spaces

The aim of the project is to intoduce new methods enabling to investigate nonlinear differential problems in generalised Sobolev and Orlicz spaces. The basal problem, which we are going to face is the problem of existence of weak solutions. We plan to obtain new a priori estimates resulting in qualitative properties of solutions such as symmetries, regularity, description of asymptotic behaviour, Liouville-type theorems and uniqueness.

In the case of such general many functional tools are lacking and therefore investigation of this problems is so challanging. The systematic approach to compact embeddings of the generalised spaces is missing.

We shall stress, that the main objective of the project is not obtaining particular result, but developing tools important and missing in this new branch of differetial equations and their application would point out their usefullness.

We hope that mathematical methods, which we introduce, will contribute in nonlinear differential problems and functional analysis of generalised Sobolev and Orlicz spaces, which are now getting international attention. Nowadays, partial differential problems in generalised spaces are investigated by several grups of mathematicians: weighted nonlinear diffusion equation in Spain, partial differential problems in variable exponent spaces in Italy, as well as in Musielak-Orlicz setting in Finland and Warsaw. This type of problems are investigated by recognised mathematicians and the results can be appretiated.