

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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Topological and Variational Methods for Partial Differential Equations

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ABSTRACT. In recent years, there has been a major impact of topological and variational methods on the study of nonlinear elliptic and parabolic partial differential equations. In particular, surprising results for classical open problems have been obtained with new techniques far beyond the classical approaches. The purpose of the meeting was to provide a forum for these developments and to bring together experts with complementary background.

Mathematics Subject Classification (2000): 35J.

Introduction by the Organisers

This was a very successful and enjoyable workshop which showed the diversity and vitality of the area. The meeting was attended by 48 participants from 16 countries representing all continents (except Antarctica). In the 26 talks given during the course of the week, both leading experts and promising young mathematicians were invited to present recent trends and new developments in the field. Most of the talks dealt with nonlinear elliptic and parabolic equations, while special emphasis was laid on

- singularities and concentrating solutions
- the interaction between PDE and geometry
- Liouville type theorems
- symmetry and symmetry breaking.

A number of important talks were concerned with solutions of nonlinear elliptic equations on all of Euclidean space. For example, in some talks surprisingly

complicated solutions tending to a constant were discussed together with connections with differential geometry. Another talk presented new solutions for elliptic systems modeling quadruple junction structures. The importance and future potential of this work was illustrated when several participants were invited to give lectures at the International Congress of Mathematicians in 2010. The atmosphere of the workshop was fruitful and stimulating, which was most visible outside the scheduled lecture time when ideas were exchanged in numerous scientific discussions in small groups. Here some promising joint research projects from experts with different methodological background were initiated. The feedback of the participants was very positive; there was a clear consensus that due to the strong dynamics of the field there is a need for regular meetings within the unique atmosphere of the MFO.