

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

Report No. 27/2008

Nonlinear Evolution Equations

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June 15th – June 21st, 2008

ABSTRACT. In this workshop three types of nonlinear evolution problems - geometric evolution equations (essentially all of parabolic type), nonlinear hyperbolic equations and dispersive equations - were the subject of 21 talks.

Mathematics Subject Classification (2000): 47J35, 74J30, 35L70, 53C44, 35Q55.

Introduction by the Organisers

Following the successful pattern of the meeting in 2005, this year's workshop on 'Nonlinear Evolution Problems' focussed on a small number of currently very active areas in this field. By far the dominant theme, however, were geometric evolution equations of parabolic type, followed by the topic of wave equations and water waves/Navier-Stokes equations both in a classical and relativistic framework.

Among the geometric evolution equations, curvature flows of hypersurfaces were considered with priority. In several talks, applications of these to isoperimetric problems and to formulation of appropriate local mass concepts were presented. One talk dealt with mean curvature flow in certain degenerate spaces. Several talks looked into harmonic and biharmonic map flow as well as Ricci flow.

Among the nonlinear hyperbolic equations, the water wave equation, Einstein's equations, semilinear wave equation and, for the first time, the d-brane equation from string theory were featured. For the latter, an ϵ -regularization method was used to establish an existence proof. This is another example of a method which has now been applied to different types of nonlinear equations. It had previously been applied to mean curvature flow and to minimal surfaces.

The last theme concerned dispersive equations. This was represented only in a talk by Markus Keel, albeit on seminal work on resonant decompositions applicable to a wide class of example.

All together, 21 talks were presented by international specialists from Australia, Canada, Germany, Great Britain, Italy, Sweden, Switzerland and the United States. Many of the speakers were only a few years past their Ph.D., some even still working towards their Ph.D.; 6 out of 42 participants and 4 out of 21 speakers were women.

As a rule, three lectures were delivered in the morning session; two lectures were given in the late afternoon, which left ample time for individual discussions.