Mathematisches Forschungsinstitut Oberwolfach

Report No. 41/2007

Analysis and Geometric Singularities

Organised by
Jochen Brüning, Berlin
Rafe Mazzeo, Stanford
Paolo Piazza, Roma

August 19th – August 25th, 2007

Abstract. This workshop focused on several main areas of current research concerning analysis on singular and noncompact spaces. Topics included classical areas like spectral asymptotics, propagation of singularities and scattering theory, index theory on singular spaces, exotic characteristic classes, boundary value problems, surgery formulae adiabatic limits, and singularities in mathematical relativity.

Introduction by the Organisers

The conference on "Analysis and Geometric Singularities" took place from August 19 to August 25, 2007. The meeting was a popular one, with all spots taken, and its atmosphere was lively and full of activity. Participants ranged from many experts and old hands in the field to many young postdocs and graduate students, and the interaction between researchers at all levels was clearly productive for everyone. The talks were notably very well attended throughout the week, and many were accompanied by lively discussions.

Each day was structured thematically: every day except Wednesday began with a longer (70 minute) survey talk on some general theme in the subject; the other talks each day were shorter (55 minutes) and focused on that theme. Wednesday morning, however, was devoted to five half-hour lectures by some of the younger participants. The first day's theme was spectral geometry; the lecture by Iosif Polterovich surveyed many recent results connecting spectral asymptotics and dynamics; later talks that day were given by Mueller, Kordyukov, Paycha and Grieser. Tuesday's survey talk by Mihalis Dafermos on the mathematics of black holes was followed by the lectures of Rodnianski, Vasy, Baer and Perry; the first

two of these especially focusing on mathematical relativity. Thursday's survey by Jared Wunsch on propagation of singularities for the Schroedinger equation was followed by talks by Lesch, Ammann, Moscovici and Dai. Friday's theme was index theory, with a survey by Richard Melrose and other lectures by Carron, Albin, Bunke and Richardson. The young researchers who spoke on Wednesday were Azzali, Degeratu, Mazzieri, J. Mueller and Rochon.

The scientific level of the talks was uniformly high, as will be seen from the abstracts which follow; many interesting results were announced, and the survey talks helped provide a focus which in turn facilitated communication between researchers in the various different fields represented. Overall, the conference gave clear evidence that the field of analysis on singular spaces is very active, and indeed is extending in many new directions. The many strong young researchers here indicate that the field has a bright future!