Martin Doležal

Personal information

Address:	Benešovská 1924/4
	101 00 Praha 10
Phone:	731 160 277
E-mail:	dolezalmart@seznam.cz
Date of birth:	22. 3. 1985

Education

2009 - 2013
Charles University in Prague, Faculty of Mathematics and Physics
Study program Mathematics, branch Mathematical Analysis
Degree Ph.D.

2007 - 2009
Charles University in Prague, Faculty of Mathematics and Physics
Study program Mathematics, branch Mathematical Analysis
Graduated with distinction, degree Mgr.

2004 - 2007
Charles University in Prague, Faculty of Mathematics and Physics
Study program Mathematics, branch General Mathematics
Graduated with distinction, degree Bc.

Publications

1. M. Doležal, *A note on the three-segment problem*,
   Math. Bohem., 134(2):211–215, 2009.

2. M. Doležal, P. Pošta, P. Pyrih, M. Rmoutil, and B. Vejnar, *Chain of dendrites without monotone supremum*,
   Questions Answers Gen. Topology, 29(2):131–133, 2011.

3. M. Doležal, P. Ludvík, P. Pošta, P. Pyrih, M. Rmoutil, and B. Vejnar, *Arcwise connected continuum with a free arc and with the fixed set property for monotone onto maps*,
   Questions Answers Gen. Topology, 30(2):135–137, 2012.

4. M. Doležal, *Characterization of σ-porosity via an infinite game*,
   Fund. Math., 216(2):109–118, 2012.

5. M. Doležal and M. Zelený, *Infinite games and σ-porosity*,
   submitted.

6. M. Doležal, *Unitary representations of finite abelian groups realizable by an action*,
   submitted.

Citations

M. Doležal and M. Zelený, *Infinite games and σ-porosity*, submitted.

citated in:

M. Koc and L. Zajíček, *On Kantorovich's result on the symmetry of Dini derivatives*, Comment. Math. Univ. Carolin., 51(4):619–629, 2010.

Prizes and Scholarships

The award of the Dean of the Faculty of Mathematics and Physics for the best master thesis of the academic year 2008/09.

First place in the competition SVOČ 2009 (a competition of students from Czech and Slovak universities in a scientific activity in mathematics).

Grant No. 149410 (Applications of descriptive set theory in mathematical analysis) from the Grant Agency of Charles University in the years 2010 - 2012.

Schools and conferences

01/2008	Winter School in Abstract Analysis Lhota nad Rohanovem, Czech Republic (talk presented)
01/2009	Winter School in Abstract Analysis Kácov, Czech Republic (talk presented)
01/2010	Winter School in Abstract Analysis Klenčí pod Čerchovem, Czech Republic
05/2010	Spring School on Analysis Paseky nad Jizerou, Czech Republic
06/2010	Week of doctoral students Prague, Czech Republic (talk presented)
01/2011	Winter School in Abstract Analysis Kácov, Czech Republic
06/2011	Real Analysis Exchange Summer Symposium Budapest, Hungary (talk presented)
01/2012	Winter School in Abstract Analysis Klenčí pod Čerchovem, Czech Republic
06/2012	Real Analysis Exchange Summer Symposium Pennsylvania State University, USA
01/2013	Winter School in Abstract Analysis Kácov, Czech Republic

Teaching experience

Since summer semester 2007/08 up to summer semester 2012/13 - practical courses in Mathematical Analysis and/or Calculus at Faculty of Mathematics and Physics of the Charles University in Prague.

Language skills

Czech:	native
English:	advanced, First Certificate in English (2003)

Research interests and plans

My research interests are primarily in descriptive set theory (Polish spaces, the Borel and the Wadge hierarchy, effective descriptive set theory, definable equivalence relations) and its applications in real and functional analysis (structural properties of porosity σ-ideals, measure preserving actions of countable groups, unitary representations of countable groups).

In my existing publications, I have investigated boundary behaviour of complex-valued functions [1], topological properties of certain continua [2, 3], σ-ideals of σ-porosity type [4, 5], the spaces of measure preserving actions and unitary representations of finite abelian groups [6]. The papers [4] and [5] form the main research results obtained during my studies. Here, tools from descriptive set theory are used to prove some new and older inscribing theorems for σ-ideals of σ-porous type in locally compact metric spaces. The method of the proofs is based on the characterization of the sets from the σ-ideal in question via an infinite game. This method was first introduced and demonstrated in a very particular case in 2006 by J. Zapletal [FZ] but its generalization runs into many technical difficulties.

I have attended the Seminar on Real and Abstract Analysis at the Faculty of Mathematics and Physics (guaranteed by Department of Mathematical Analysis) since winter semester 2009/10. Some of the topics presented at the seminar are very close to my interests and I plan to keep attending the seminar in the future. I have also been an active member of research teams of the grants GAČR 201/09/0067 (2010–2011) and GAČR 201/12/0436 (2012–2013) (the head of the research groups of both these grants is prof. RNDr. Luděk Zajíček, DrSc).

My research plans for the near future include investigation of some problems concerning the spaces of unitary representations and measure preserving actions of countable groups. Currently, I try to expand the result from [6] to more general groups than just finite abelian ones. More precisely, I consider the question of how many (with respect to Baire categories) unitary representations of a countable group are realizable by an action (i.e., how many of them are unitarily equivalent to a Koopman representation of the group on some probability space). This and some other related questions can be found in the monograph [Ke] which serves as a good source of inspiration for me.

[FZ] I. Farah and J. Zapletal. *Four and more.*
      Ann. Pure Appl. Logic, 140(1-3):3–39, 2006.

[Ke] A. S. Kechris. *Global aspects of ergodic group actions,*
      volume 160 of Mathematical Surveys and Monographs. American Mathematical Society, Providence, RI, 2010.