Regularity properties and definability in the real number continuum: idealized forcing, polarized partitions, Hausdorff gaps and mad families in the projective hierarchy

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Citation for published version (APA):
Khomskii, Y. D. (2012). Regularity properties and definability in the real number continuum: idealized forcing, polarized partitions, Hausdorff gaps and mad families in the projective hierarchy Amsterdam: Institute for Logic, Language and Computation

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The two people I would like to thank most of all are the two supervisors of my thesis, Benedikt Löwe and Jörg Brendle, whose guidance and support have been indispensable for the completion of this dissertation.

From the first moment I walked into Benedikt’s office and he told me “congratulations on your switch from mathematics to logic”, Benedikt has been guiding my progress (and lack thereof) with unyielding care and attention, all the way up to its very culmination which is the publication of this thesis. Thanks to him, my first “switch” has been smooth and successful, as has been my second “switch”—from student to researcher. Benedikt always remained closely involved with my work and academic development, and would never fail to respond and do his utmost best for me whenever I needed his help, in any matter whatsoever. I am deeply indebted to him for the success of my entire academic life until this point.

Jörg’s contribution to this thesis has likewise been enormous: I simply cannot imagine what this book would have looked like if it hadn’t been for his help, except that it would have been very, very much thinner! Working with Jörg has been a tremendously productive, educative and, above all, enjoyable experience, and his particular style of doing mathematics—which sometimes felt more like Zen meditation than science—will always stand out to me as an inexhaustible source of inspiration. It was also thanks to Jörg that I had the opportunity to make three extremely formative and intense visits to Japan, which I consider to be the focal points of my entire PhD experience.

I would like to sincerely thank all the members of my doctorate committee: Joan Bagaria, Alexandru Baltag, Stefan Geschke, Dick de Jongh, Jouko Väänänen and Yde Venema, for taking the time and effort to critically and appreciatively read this manuscript. For Dick, I would like to reserve a special kind word: our interactions with him for the duration of my stay in Amsterdam have been extremely pleasant and fruitful, and meant much to me. In Dick’s presence I always had the feeling of being treated as a good mathematician.
Many set theorists greatly helped me along the way. First to mention would surely be Daisuke Ikegami, whose work on forcing absoluteness had a strong influence on all of my work. He was kind enough to spend hours explaining mathematics to me at a time when I didn’t even know what “proper forcing” was, and my conversations with him had the effect of a kind of initiation ritual into “real research”—even if he kept reminding me that his work was trivial and I should be reading Woodin’s papers instead!

During the summer of 2009, at the ESI set theory workshop in Vienna, I was lucky to have met Jindřich Zapletal, who (apparently by total coincidence) had just proved some results that were closely related to the problem I was working on at that moment. Jindra was so generous as to spend time and explain his proof to me in detail, which ultimately led to Chapter 3 of this thesis being what it now is. I am very grateful for his help.

There were many other set theorists whom I met across the world, and who have helped, influenced, inspired, or in some other way contributed to my PhD thesis: Joan Bagaria, Andrés Eduardo Caicedo, Gregor Dolinar, Sy-David Friedman, Sakae Fuchino, Stefan Geschke, Joel David Hamkins, Michael Hrušák, Juliette Kennedy, Peter Koepke, Robert Lubarsky, Adrian Mathias, Lionel Nguyen Van Thé, Carlos A. Di Prisco, Dilip Raghavan, Marcin Sabok, Stevo Todorcević and Jouko Väänänen. I should also mention Klaas-Pieter Hart, the only Dutch set theorist (myself excluded) who so kindly helped me to convert my abstract into a **samenvatting**.

The ILLC has been a wonderful environment for me to work, grow and develop in, and I was happy to meet and interact with many colleagues, all of whom deserve a collective word of gratitude: Dora Achourioti, Stéphane Airiau, Edgar José Andrade-Lotero, Gideon Borensztaïn, Inês Crespo, Ulle Endriss, Nina Gierasimczuk, Umberto Grandi, Lauri Keskinen, Lena Kurzen, Zhenhao Li, Raúl Leal Rodriguez, Olivier Roy, Federico Sangati, Sanchit Saraf, Brian Semmes, Sumit Sourabh, Marysia Spychalska, Jakub Szymanik, Sourav Tariqder, Joel Uckelman, Sara Uckelman, Fernando Velázquez-Quesada, Jacob Vosmaer, Shengyang Zhong, as well as many others. Special thanks to Dora for first being a guinea-pig to my set-theory-teaching skills, and then being a very good friend, and for raising my mathematical self-esteem ever so often.

Let me thank the entire administrative team of the ILLC: Jenny Batson, Karin Gigengack, Tanja Kassenaar, Ingrid van Loon, Peter van Ormondt, and Marco Vervoort, for providing such a great, research-friendly environment within the ILLC community, and for always being ready to help out whenever I had a problem.

Many other people have crossed my path, who, though not directly involved in my research, nevertheless greatly contributed to it by inspiring, motivating or supporting me in their own way. Among these “inspirational figures” I would especially like to mention Joseph Johannes Visser and Klára Würtz. Additionally, I want to mention the members of our “Mosaic support group”: Zeynep Gündüz,
Daniil Umanski and Kavita Ziemann; and other friends whose thoughts and ideas have had an impact on me: Vassiliki Arvaniti, Julia Casianova, Inés Crespo, Mara van Pommeren and Sophie Raynor.

On a different note: as I was calmly working on my PhD, Julia Tsenova, who was my mother-in-law, my spiritual guide, and possibly the greatest composer, unexpectedly passed away in the spring of 2010. She was an exceptional person in every way, and I would like to dedicate this thesis in her memory.

Finally, I want to thank my closest family: my wonderful parents, for their continuous and unconditional support of me, my PhD and everything else, and for being role models for my own aspirations; my wife Kristina Sandulova, for her love, care, respect, patience, support, understanding, and willingness to take over my family duties so that I could teach a lecture or attend a meeting at odd times without anyone noticing; and my children, Marin and Klara, who were growing up together with this thesis and thus had to share my attention with it—but hopefully can, one day, be proud of it.

Amsterdam

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January 2012