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Habilitation Board Decision on the Nomination for Appointment to Associate Professor

Masaryk University	
Faculty	Faculty of Science
Procedure field	Mathematics - Mathematical Analysis
Applicant	Ing. Bc. Tomáš Kisela, Ph.D.
Applicant's home unit, institution	Brno University of Technology, Faculty of Mechanical Engineering, Department of Mathematical Analysis
Habilitation thesis	Qualitative theory of fractional differential systems with time delay
Board members	
Chair	prof. Mgr. Petr Hasil, Ph.D.
	Faculty of Science, Masaryk University
Members	prof. RNDr. Miroslav Engliš, DrSc.
	Mathematical Institute in Opava, Silesian University
	prof. RNDr. Jaroslav Jaroš, CSc.
	Univerzita Komenského Bratislava
	prof. Mgr. Pavel Řehák, Ph.D.
	Institute of Mathematics, Faculty of Mechanical Engineering, Brno University of Technology
	Prof. Dr. Stefan Siegmund
	Dresden University of Technology, Germany

Evaluation of the applicant's scholarly/artistic qualifications

Ing. Tomáš Kisela, Ph.D., graduated in 2008 in double diploma programme of Mathematical Engineering at Brno University of Technology (BUT) together with the University of L'Aquila in Italy. In 2012, he received his Ph.D. degree in the doctoral programme of Applied Mathematics at the Faculty of Mechanical Engineering of BUT, supervisor prof. Jan Čermák. His professional experience includes the postdoctoral position at the Institute of Mathematics BUT (2012-2015), and the position of the researcher at the same department (since 2015).

The research of T. Kisela has focused on the applied theory of differential equations of real orders. These equations represent an important tool for modelling many problems in natural and technical sciences. The main scientific interest of T. Kisela is the stability of fractional delay differential equations and systems, structural analysis of dynamic systems and their stabilisation or synchronisation using delay-feedback control. Following qualitative analysis, his scientific contribution also includes numerical stability and implementation of appropriate algorithms.

T. Kisela is the author or co-author of 24 original research articles, of which 21 are indexed in the WoS database (as of February 17, 2025), including 11 articles in Q1 journals (9 of them even in D1 journals), 4 articles in Q2 journals, 2 articles listed in Scopus and 3 articles in conference proceedings. He is the co-author of a book chapter (Nova Science Publishers), and 2 software products.

The papers of T. Kisela are highly cited – they have 327 citations in the WoS database without self-citations, his WoS h-index is 10 (as of February 17, 2025). Key results of T. Kisela concern stability and other qualitative properties of fractional delay differential equations. These results (also included in the habilitation thesis) have been published in 6 high-impact papers with a positive acceptance by the mathematical community (two most influential papers have 60 and 44 WoS citations without self-citations). T. Kisela also achieved important results (not included the in his habilitation thesis) in other related areas such as discrete fractional calculus and numerical analysis (his most influential papers in these areas have 38 and 26 WoS citations without self-citations).

T. Kisela has a fruitful collaboration with foreign institutions. In particular, during his scientific stay at the University of Santiago de Compostela and the University of Vigo, he wrote a paper (not included the in habilitation thesis) jointly with A. Cabada on periodic solutions of some nonlinear fractional differential equations. The paper currently has 29 WoS citations without self-citations. T. Kisela was invited to present his results at prestigious international conferences such as NABVP (Spain, 2018) and ICFDA (Italy, 2014). He was also invited to the international workshop Fractional Calculus Day (Slovakia, 2017), aimed at young researchers from all over the world specialised in the area of (applied) fractional calculus, where he was standing alongside the famous names of fractional calculus such as prof. Blas M. Vinagre (Spain) and prof. Richard L. Magin (USA).

T. Kisela was a member of the research teams of two projects of the Czech Science Foundation during 2017-2022 and one project of the Operational Programme Enterprise and Innovations for Competitiveness during 2020-2022.

The Habilitation Committee states that Tomáš Kisela is a mature scientific personality with high quality scientific results, regular publications, and a good international response.

Conclusion: The applicant's scholarly/artistic capabilities **meet** the requirements expected of applicants participating in a habilitation appointment procedure in the field of Mathematics - Mathematical Analysis.

Evaluation of the applicant's pedagogical experience

The pedagogical qualification of T. Kisela includes full-semester lectures and tutorials on mathematics and statistics in several bachelor and master programmes at BUT during the last decade.

He has supervised 10 bachelor students and 5 master students (of which 14 successfully defended theses and 1 bachelor thesis in progress). Since 2024, he is the supervisor of a Ph.D. student in the doctoral programme Applied Mathematics.

T. Kisela is an excellent teacher. In addition to his regular teaching activities, he has given several significant talks for a general mathematical audience as well as for management of companies. In particular, he delivered a plenary talk at a conference celebrating the 150th anniversary of the founding of the Union of Czech Mathematicians and Physicists. His scientific popularisation activities were also recognised with the award for the best mathematical article (co-authored with J. Čermák and L. Nechvátal) published during the period 2018-2021 in Pokroky matematiky, fyziky a astronomie, as voted by the journal's editorial board.

Conclusion: The applicant's pedagogical capabilities **meet** the requirements expected of applicants participating in a habilitation appointment procedure in the field of Mathematics - Mathematical Analysis.

Habilitation thesis evaluation

The habilitation thesis of T. Kisela, entitled "Qualitative theory of fractional differential systems with time delay", combines the key results of seven pivotal papers from 2016-2023, supplemented by a common extensive introduction.

The Habilitation Committee appointed three internationally recognised experts in the field of mathematical analysis as reviewers. They are prof. Roberto Garrappa (University of Bari Aldo Moro, Italy), prof. Eva Kaslik (West University of Timisoara, Romania) and prof. Agnieszka Malinowska (Bialystok University of Technology, Poland).

All reviewers highly appreciated the scientific level and novelty of his work and the results achieved. From the evaluative parts of the reports we can mention the following.

- Different aspects of this topic have been investigated, thus showing an excellent versatility of the candidate in dealing with different and prominent aspects of the topic under investigation.

- Dr. Tomáš Kisela has an excellent reputation among the international scientific community working on fractional calculus and his contributions on stability and qualitative aspects of solutions of FDEs are widely appreciated.

- The candidate has demonstrated a strong ability to conduct independent research, and his work has already influenced the field significantly.

- The thesis makes an outstanding contribution to the theory of fractional delay differential equations, offering novel insights into their stability and oscillation behavior.

Conclusion: The applicant's habilitation thesis **meets** the requirements expected of habilitation theses in the field of Mathematics - Mathematical Analysis.

Secret vote results

Voting took place: electronically

Number of board members		5
Number of votes cast		5
of which	in favour	5
	against	0

Board decision

Based on the outcome of the secret vote and following an evaluation of the applicant's scholarly or artistic qualifications, pedagogical experience and habilitation thesis, the board hereby submits a proposal to the Scientific Board of the Faculty of Science of Masaryk University to **appoint the applicant associate professor** of Mathematics - Mathematical Analysis.

In Brno on 04.03.2025

prof. Mgr. Petr Hasil, Ph.D.