

Masaryk University	
Faculty	Faculty of Science
Procedure field	Mathematics - Mathematical Analysis
Applicant	doc. Mgr. Petr Hasil, Ph.D.
Applicant's home unit, institution	Faculty of Science, Masaryk University
<u>Board members</u>	
Chair	prof. RNDr. Zuzana Došlá, DSc. <i>Faculty of Science, Masaryk University</i>
Members	prof. RNDr. Miroslav Engliš, DrSc. <i>Institute of Mathematics of the Czech Academy of Sciences, Prague; Mathematical Institute in Opava, Silesian University</i>
	prof. RNDr. Vladimír Müller, DrSc. <i>Institute of Mathematics of the Czech Academy of Sciences, Prague</i>
	Prof. RNDr. Mihály Pituk, DSc. <i>Department of Mathematics, University of Pannonia, Hungary</i>
	Prof. Gerald Teschl <i>University of Vienna, Austria</i>

Evaluation of the applicant's scholarly/artistic qualifications

Doc. Petr Hasil received his Ph.D. in 2010 in the field Mathematics – Mathematical Analysis (Masaryk University), under the supervision of Prof. Ondřej Došlý, and he received the title Associate Professor (Doc.) in the field Mathematics – Mathematical Analysis (Masaryk University) in 2017, four years after he returned to Masaryk University (MU).

His professional experience includes assistant professor at Mendel University (2008–2016) and at Masaryk University (2013–2016). During 2009, for one semester, he acted as a teaching assistant at the Faculty of Mathematics and Economics, University of Ulm, Germany, where he worked on research in the field of difference systems as well.

Since 2017 Petr Hasil has been an associate professor at the Department of Mathematics and Statistics, Faculty of Science, Masaryk University. During 2019–2023, he was the leader of the research team of Mathematical Analysis in the Department of Mathematics and Statistics. Since July 1, 2023, he is the director of this department.

The primary area of scientific interest of Petr Hasil is the oscillation theory of linear and half-linear differential and difference equations. More precisely, he is mainly interested in identifying critical oscillation constants which are the thresholds between the oscillation and non-oscillation of such equations. He extended the Riccati technique for half-linear differential and difference equations as well as for dynamic equations on time scales. His results are optimal for some classes of equations and new even for linear equations, which brings new directions for research in many other areas. These problems are applicable, e.g., to the boundary value problems on half-line with p -Laplacian. Further topics of his scientific interest include the spectral analysis of difference operators and the investigation of almost period solutions for difference systems.

In 2008, he proved the conditional oscillation of half-linear Euler type differential equations with periodic coefficients. This result has initiated an extensive research concerning the conditional oscillation of more general differential equations and difference equations as well as dynamic equations on time scales. Together with Prof. Došlý, he presented a useful modification of the Prüfer angle in 2011. This modification has been repeatedly applied in the oscillation theory of perturbed equations. In addition, he introduced many versions of the Riccati transformation and illustrated their possibilities in the area. With Doc. Veselý, he proved the conditional oscillation of linear Euler type difference equations with almost periodic coefficients, which covers also the corresponding result for equations with periodic coefficients (2012). Note that this problem was formulated, as open, more than 60 years ago. They have continued in the research direction given by the conditional oscillation. For example, they published a number of papers about the oscillation of differential equations with perturbations (also together with other co-authors) and they found a new very general class of conditionally oscillatory linear differential equations in 2021.

As of September 6, 2023, his record as author or co-author contains 51 original research articles according to the MathSciNet database of the American Mathematical Society, as well as 50 articles in the WoS database. His papers are published in high-ranking journals like Applied Mathematics and Computation, Applied Mathematics Letters, Journal of Mathematical Analysis and Applications, Proceedings of the American Mathematical Society and others. According to the MathSciNet database, those articles have 504 citations, as well as 234 citations without self-citations in the WoS database and these numbers are rapidly increasing. His WoS and Scopus h-index is 15.

He lectured on his results at international conferences and workshops. He participated in several scientific stays abroad, namely University of Ulm, Slovak Academy of Sciences in Bratislava, and Comenius University in Bratislava. He collaborates with specialists, e.g., from Japan, Italy, Slovakia, and Austria.

Petr Hasil created his own scientific school in the qualitative theory of ordinary differential and difference equations. He was a supervisor of two PhD students, namely Jiřina Šišoláková (graduated in 2022) and Jan Jekl (2023). Both are now active and respected academics.

Petr Hasil was a member of the research teams of four projects of the Czech Science Foundation during 2007–2022. In 2010, he obtained dean's award for extraordinary results in research. He served as the mentor within the doctoral project in 2021, he was the responsible investigator of two MU development projects, etc.

He was a member of the organizing committee of the international conference EQUADIFF 15, Brno 2022. He is a respected member of the International Society of Difference Equations (as stated by its former president prof. Bohner in his recommendation letter).

The Committee states that Petr Hasil is a mature scientific personality with high-quality scientific results, regular publications, and good international response.

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

Evaluation of the applicant's pedagogical experience

Petr Hasil has long-term and extensive experience in teaching mathematics. His pedagogical qualifications include full-semester lectures and exercise sessions in mathematics at Mendel University, Ulm University, and a number of lectures for students at the Faculty of Science and Faculty of Informatics MU, undergraduate and advanced courses in mathematical analysis for students in the Mathematics and Applied Mathematics programme, and courses for undergraduate students in physics programmes. He served as a consultant and head of preparing committees for the accreditation of mathematics programmes at the Faculty of Science MU, and he improved several courses of mathematics at the Faculty of Informatics MU and Mendel University.

He supervised 13 bachelor students, 7 master students, and (the above mentioned) 2 doctoral students who successfully defended their theses.

He is an excellent teacher. He published several textbooks on mathematical analysis, mainly online, therefore with large audience. He co-authored a textbook published at Elportal MU which has been one of the most visited publications within Elportal (its third edition has almost 60 thousand accesses).

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

Evaluation of the applicant as a respected and recognized scholarly or artistic figure in a given field

Based on the above, it is evident that Petr Hasil is an exceptional personality in the area of research and teaching. He is a respected and internationally recognized researcher who is also declared by the worldwide citation response. His educational activities are also extraordinary with exceptionally good feedback from students.

There is no doubt that he meets the conditions for appointment as a full professor in Mathematics – Mathematical Analysis.

Conclusion: The applicant **is** a respected and recognized scholarly figure in his/her field. The applicant **has** made a significant contribution to the development of his/her field. The applicant **constitutes** a leading figure in his/her field of scholarship or research.

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 role as a respected and recognized scholarly or artistic figure, the board hereby submits a proposal to the Scientific Board of the Faculty of Science of Masaryk University to **appoint the applicant professor** of Mathematics - Mathematical Analysis.

In Brno on 13.09.2023

prof. RNDr. Zuzana Došlá, DSc.