

## 2020 Research-related activities

### BUT FCE Institute of Mathematics and Descriptive Geometry

#### Staff:

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Professors                   | Josef Diblík, Jiří Vala                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Associate professors         | Irena Hinterleitner, Jiří Novotný, Alena Vanžurová                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Assistant professors         | Darina Brothánková, Jana Bulantová, Hana Halfarová, Jan Holešovský, Jana Hřebíčková (to 31. 8. 2020), Veronika Chrastinová, Eva Jansová, Helena Koutková, Vladislav Kozák (from 15. 9. 2020), Kristýna Mencáková, Karel Mikulášek, Blanka Morávková, Radko Odehnal, Šárka Pechancová, Kateřina Pokorová, Květoslava Prudilová, Oto Příbyl, Petra Rozehnalová, Lenka Rýparová, Rudolf Schwarz, Jana Slaběňáková, Jan Šafařík, Hana Šafářová, Pavel Špaček, Jan Vondra, Lucie Zrůstová |
| Technical and economic staff | Zdeňka Dvorská (from 7. 9. 2020), Jarmila Janochová ( 31. 5. 2020), Alena Vlčková                                                                                                                                                                                                                                                                                                                                                                                                    |

#### Papers in journals:

1. BEREZOVSKI, V.; CHEREVKO, Y.; HINTERLEITNER, I.; PEŠKA, P. Geodesic Mappings of Spaces with Affine Connections onto Generalized Symmetric and Ricci-Symmetric Spaces. *Mathematics* 8/9 (2020), 1–13. ISSN 2227-7390. IF 1,747.
2. DIBLÍK, J.; MENCÁKOVÁ, K. Representation of solutions to delayed linear discrete systems with constant coefficients and with second-order differences. *Applied Mathematics Letters* 105 (2020), 106309/1–7. ISSN 0893-9659. IF 3,848.
3. DIBLÍK, J.; MENCÁKOVÁ, K. A Note on Relative Controllability of Higher-Order Linear Delayed Discrete Systems. *IEEE Transactions on Automatic Control* 65/12 (2020), 5472–5479. ISSN 0018-9286. IF 5,625.
4. HANÁK, T.; TUSCHER, M.; PŘIBYL, O. Hybrid Genetic Algorithm-Based Approach for Estimating Flood Losses on Structures of Buildings. *Sustainability* 12/7 (2020), 1–16. ISSN 2071-1050. IF 2,576.
5. CHRASTINOVÁ, V.; TRYHUK, V. The Poincaré-Cartan forms of one-dimensional variational integrals. *Mathematica Slovaca* 20/6 (2020), 1381–1412. ISSN 0139-9918. IF 0,654.

6. HOLEŠOVSKÝ, J.; FUSEK, M. Estimation of the extremal index using censored distributions. *Extremes* 23/2 (2020), 197–213. ISSN 1386-1999. IF 1,136.
7. MIKEŠ, J.; HINTERLEITNER, I.; GUSEVA, N. Geodesic maps “in the large” of Ricci-Flat spaces with  $n$  complete geodesic lines. *Mathematical Notes* 108/1–2 (2020), 292–296. ISSN: 0001-4346. IF 0,626.
8. VALA, J.; KOZÁK, V. Computational analysis of quasi-brittle fracture in fibre reinforced cementitious composites. *Theoretical and Applied Fracture Mechanics* 107 (2020), 102486/1–8. ISSN 0167-8442. IF 3,021.
9. VALA, J.; KOZÁK, V.; JAROŠOVÁ, P. On a computational approach to micro- and macro-modelling of damage in brittle and quasi-brittle materials. *International Journal of Mechanics* 14 (2020), 185–197. ISSN 1998-4448.

### Papers in conference proceedings:

1. BULANTOVÁ, J., LACHOVÁ, A. Teoretické řešení střech s Geogebrou. *Proceedings of the Czech-Slovak Conference on Geometry and Graphics 2020* in Pardubice, 71–74. Vydavatelství servis Plzeň, 2020. ISBN 978-80-86843-71-1.
2. DEMCHENKO, H.; DIBLÍK, J.; KHUSAINOV, D. Optimal control of the heating process with delay. *17<sup>th</sup> International Conference on Numerical Analysis and Applied Mathematics 2019 (ICNAAM2019)* in Rhodes, *AIP Conference Proceedings* 2293 (2020), 340016/1–4, American Institute of Physics, 2020. ISSN 0094-243X.
3. HALFAROVÁ, H.; DIBLÍK, J.; ŠAFAŘÍK, J. On the number of arbitrary parameters in the general solution to a weakly delayed planar linear discrete system with constant coefficients. *17<sup>th</sup> International Conference on Numerical Analysis and Applied Mathematics 2019 (ICNAAM 2019)* in Rhodes, *AIP Conference Proceedings* 2293 (2020), 340008/1–4, American Institute of Physics, 2020. ISSN 0094-243X.
4. MENCÁKOVÁ, K.; DIBLÍK, J. Relative controllability of a linear system of discrete equations with single delay. *17<sup>th</sup> International Conference on Numerical Analysis and Applied Mathematics 2019 (ICNAAM2019)* in Rhodes, *AIP Conference Proceedings* 2293 (2020), 340009/1–4, American Institute of Physics, 2020. ISSN 0094-243X.
5. MENCÁKOVÁ, K.; ŠAFAŘÍK, J. Výuka deskriptivní geometrie na FAST VUT v době „koro-navirové“. *Proceedings of the Czech-Slovak Conference on Geometry and Graphics 2020* in Pardubice, 131–138. Vydavatelství servis Plzeň, 2020. 978-80-86843-71-1.
6. PAZDERA, L.; TOPOLÁŘ, L.; KOCÁB, D.; VYMAZAL, T.; MIKULÁŠEK, K. Evaluation of the acoustic emission measurement performed during freeze-thaw cycles loading. *Book of full paper of 58<sup>th</sup> Experimental Stress Analysis 2020* in Ostrava, 387–392. Czech Society for Mechanics, 2020. ISBN 978-80-248-4451-0.
7. URBÁNEK, F.; ZRŮSTOVÁ, L. Přehled základních konstrukcí lineární perspektivy v programu Geogebra. *Proceedings of the Czech-Slovak Conference on Geometry and Graphics 2020* in Pardubice, 183–186. Vydavatelství servis Plzeň, 2020. 978-80-86843-71-1.
8. VALA, J. Nonlocal damage modelling of quasi-brittle composites. *17<sup>th</sup> International Conference on Numerical Analysis and Applied Mathematics 2019 (ICNAAM 2019)* in

Rhodes, *AIP Conference Proceedings* 2293 (2020), 340002/1–4, American Institute of Physics, 2020. ISSN 0094-243X.

9. VALA, J. On the computational finite cylinder source model for energy piles. In *AIP Conference Proceedings Volume 2305 25<sup>th</sup> International Meeting on Thermophysics 2020 in Smolenice (Slovakia)*, *AIP Conference Proceedings* 2305 (2020), 020021/1–6, American Institute of Physics, 2020. ISSN 0094-243X.
10. VALA, J. Modelling of micro- and macro-fracture in cementitious composites. *Proceedings of Algoritmy 2020* in Podbanské (Slovakia), 181–190. Spektrum STU Bratislava, 2020. ISBN 978-80-227-5032-5.

### Participation in research projects:

1. *Výpočtová analýza vzniku a šíření trhlin v kvazikřehkých materiálech rozšířenou metodou konečných prvků*, project of specific research FAST-S-20-6294, solution provider J. Vala. MAT: J. Holešovský, J. Vala.
2. *Řešení vzniku a šíření trhlin pomocí rozšířené metody konečných prvků (XFEM)*, project of specific research FAST-J-20-6401, solution provider M. Jedlička. MAT: J. Vala.
3. Optimalizace energopilot pro využití energie země, project TA ČR 129S05050, solution provider O. Šíkula. MAT: O. Příbyl.

### Conferences co-organized:

*Česko-slovenská konference o geometrii a grafice*, 7. až 10. září 2020, Member of the Organizing Committee J. Šafařík.

*18<sup>th</sup> ICNAAM (International Conference on Numerical Analysis and Applied Mathematics)* in Rhodes, 23. až 28. září 2020, sekce č. 46 *Dynamical Systems and their Applications to Advanced Materials, Structures and Technologies*, section organizer J. Vala.

### Doctoral study:

|                   |                              |                                                         |
|-------------------|------------------------------|---------------------------------------------------------|
| K. Pokorová       | supervisor prof. I. Horová   | MU SCI in Brno<br>(successfully finished 3. 3. 2020)    |
| K. Mencáková      | supervisor prof. J. Diblík   | BUT FEEC in Brno<br>(successfully finished 4. 12. 2020) |
| O. Příbyl         | supervisor doc. J. Raclavský | BUT FCE in Brno                                         |
| L. Rýparová       | supervisor prof. J. Mikeš    | UP FS in Olomouc<br>(successfully finished 28. 8. 2020) |
| M. Jedlička (STM) | supervisor prof. J. Vala     | BUT FCE in Brno                                         |

*Brno on 1st March 2021*

prof. RNDr. Josef Diblík, DrSc.,  
head of MAT institute