Záznamy vložené do ASEP za UI (1. 4. – 31. 5. 2023)

New ICS records in ASEP (1. 4. – 31. 5. 2023)

0572361 - ÚI 2024 RIV US eng B - Monography
Martinková, Patrícia - Hladká, Adéla
Computational Aspects of Psychometric Methods With R.
Boca Raton: CRC Press (Taylor & Francis Group, LLC), 2023. 348 s. ISBN 978-0-367-51538-6
R&D Projects: GA ČR(CZ) GA21-03658S
Institutional support: RVO:67985807
Keywords : psychometrics * measurement in social sciences * item response theory * reliability * validity
OECD category: Statistics and probability
https://dx.doi.org/10.1201/9781003054313
DOI: 10.1201/9781003054313
This book covers the computational aspects of psychometric methods involved in developing measurement instruments and analyzing measurement data in social sciences. It covers the main topics of psychometrics such as validity, reliability, item analysis, item response theory models, and computerized adaptive testing. The computational aspects comprise the statistical theory and models, comparison of estimation methods and algorithms, as well as an implementation with practical data examples in R and also in an interactive ShinyItemAnalysis application.
Permanent Link: https://hdl.handle.net/11104/0343085

0571157 - ÚI 2024 RIV NL eng J - Journal Article
Davoodi, Akbar - Maherani, L.
On the total versions of 1-2-3-Conjecture for graphs and hypergraphs.
Discrete Applied Mathematics. Roč. 336, 15 September 2023 (2023), s. 1-10. ISSN 0166-218X. E-ISSN 1872-6771
R&D Projects: GA ČR(CZ) GA19-08740S
Institutional support: RVO:67985807
Keywords : Vertex coloring * Edge weighting * Hypergraphs
OECD category: Applied mathematics
Impact factor: 1.254, year: 2021
Method of publishing: Limited access
https://doi.org/10.1016/j.dam.2023.03.021
DOI: 10.1016/j.dam.2023.03.021
In 2004, Karoński, Łuczak and Thomason proposed 1-2-3-Conjecture: For every nice graph G there is an edge weighting function w:E(G)→{1,2,3} such that the induced vertex coloring is proper. After that, the total versions of this conjecture were suggested in the literature and recently, Kalkowski et al. have generalized this conjecture to hypergraphs. In this paper, some previously known results on the total versions are improved. Moreover, an affirmative answer is given to the conjecture for some well-known families of hypergraphs like complete n-partite hypergraphs, paths, cycles, theta hypergraphs and some geometric planes. Also, these hypergraphs are characterized based on the corresponding parameter.
Permanent Link: https://hdl.handle.net/11104/0342442

0571017 - ÚI 2024 RIV CH eng J - Journal Article
Abbas, S. - Waseem, M. - Yaseen, M. - Latif, Yasir - Leta, M. K. - Khan, T. - Sher, M.
Spatial-Temporal Seasonal Variability of Extreme Precipitation under Warming Climate in Pakistan.
Atmosphere. Roč. 14, č. 2 (2023), č. článku 210. E-ISSN 2073-4433
Grant - others: AV ČR(CZ) AP1901
Program: Akademická prémie - Praemium Academiae
Institutional support: RVO:67985807
Keywords : extreme precipitation indices * very heavy precipitation * severe precipitation * wet and dry days * Upper Indus Basin
OECD category: Climatic research
Impact factor: 3.110, year: 2021
Method of publishing: Open access
https://dx.doi.org/10.3390/atmos14020210
DOI: 10.3390/atmos14020210
Climate science has confirmed the alteration of the hydrological cycle attributed to global warming. This warming tendency affects the monsoon precipitation in Pakistan with an unprecedented intensity, causing severe flooding. Therefore, it is inevitable to observe the recent spring and summer monsoon changes in extreme precipitation throughout Pakistan. The present study examined 8 precipitation indices in the past 50-year period (1971–2020) (stretched to two data periods, 1971–1998 and 1999–2020) using Mann–Kendall and Sen's method to investigate the direction and magnitude of the observed trends. Spring and summer wet days significantly increased in the central eastern (Kakul, Kotli, Jhelum) and western (Cherat, Chitral, Peshawar) regions in the 1st data period but significantly decreased in areas including the southern region in the 2nd data period. We further observed the high-intensity precipitation days (R10, R20) in the same seasons. The intensity of summer R20 was much stronger throughout Pakistan in the 1st data period which reduced significantly during the 2nd data period in northern and southern regions. We extended the circle of investigation to very heavy and extreme precipitation (R30 and R50). The intensity of R30 and R50 in summer followed the same pattern as observed for R10 and R20. However, R30 and R50 in pre-monsoon significantly increased in the northern, east-western, and south-eastern regions during the 2nd data period. Summer monsoon and westerly humid regions experienced a decreasing tendency of very heavy and severe precipitation in the 1st data period. Our results concluded that the most significant changes in precipitation extremes occurred with higher intensity and recurring frequency for all indices in spring and summer monsoon during the 2nd data period.
Permanent Link: https://hdl.handle.net/11104/0342333

0570805 - FZÚ 2024 RIV US eng J - Journal Article
Acero, M. A. - Adamson, P. - Aliaga, L. - Filip, Peter - Hakl, František - Lokajíček, Miloš - Zálešák, Jaroslav ... Total 214 authors
Measurement of the ν_e-nucleus charged-current double-differential cross section at $\langle E_\nu \rangle$= 2.4 GeV using NOvA.
Physical Review Letters. Roč. 130, č. 5 (2023), č. článku 051802. ISSN 0031-9007. E-ISSN 1079-7114
Research Infrastructure: Fermilab-CZ II - 90113
Institutional support: RVO:68378271 ; RVO:67985807
Keywords : NOvA * numerical calculations: Monte Carlo * nucleus
OECD category: Particles and field physics; Particles and field physics (UIVT-O)
Impact factor: 9.185, year: 2021
Method of publishing: Open access
DOI: 10.1103/PhysRevLett.130.051802

The inclusive electron neutrino charged-current cross section is measured in the NOvA near detector using 8.02×10208.02×1020 protons-on-target (POT) in the NuMI beam. The sample of GeV electron neutrino interactions is the largest analyzed to date and is limited by ≃≃ 17% systematic rather than the ≃≃ 7.4% statistical uncertainties. The double-differential cross section in final-state electron energy and angle is presented for the first time, together with the single-differential dependence on Q2Q2 (squared four-momentum transfer) and energy, in the range 1 GeV ≤Ev<≤Ev<6 GeV. Detailed comparisons are made to the predictions of the GENIE, GiBUU, NEUT, and NuWro neutrino event generators. The data do not strongly favor a model over the others consistently across all three cross sections measured, though some models have especially good or poor agreement in the single differential cross section vs. Q2Q2.
Permanent Link: https://hdl.handle.net/11104/0342143

0571294 - ÚI 2024 US eng J - Journal Article
Bače, R. - Hofmeister, J. - Vítková, L. - Brabec, Marek - Begović, K. - Čada, V. - Janda, P. - Kozák, D. - Mikoláš, M. - Nagel, T. A. - Pavlin, J. - Rodrigo, R. - Vostárek, O. - Svoboda, M.
Response of habitat quality to mixed severity disturbance regime in Norway spruce forests.
Journal of Applied Ecology. Online first 31 March 2023 (2023). ISSN 0021-8901. E-ISSN 1365-2664
Institutional support: RVO:67985807
Keywords : biodiversity * canopy openness * disturbance regime * forest ecology * forest structure * habitat quality * Picea abies (L.) Karst * spatial heterogeneity
OECD category: Statistics and probability
Impact factor: 6.869, year: 2021
Method of publishing: Open access
DOI: 10.1111/1365-2664.14409
1. Natural disturbances change forest habitat quality for many species. As the extent and intensity of natural disturbances may increase under climate change, it is unclear how this increase can affect habitat quality on different spatial scales. To support management tools and policies aiming to prevent habitat loss, we studied how habitat quality develops in the long run depending on the disturbance severity using a space-for-time substitution approach. 2. We explored the effects of time since disturbance (0–250 years) and disturbance severity (20%–100% canopy removal) on structure-based habitat quality indicators in European primary Norway spruce Picea abies forests using 1000 m2 circular plots in hierarchical design (a total of 407 plots in 35 stands). Disturbance history was reconstructed from tree cores. Habitat quality indicators were modelled as a function of the severity of the most severe disturbance and the time since this disturbance. We hypothesised that high within-stand habitat heterogeneity is formed by different successional stages after disturbances of various intensities. 3. The results showed a U-shaped response of habitat quality to post-disturbance habitat succession on the plot scale. The decline deepened with disturbance severity. The U-shape response occurred in: large tree occurrence, amount of standing and lying deadwood, diversity of understory and understory openness. The spatial diversity in disturbance parameters increased spatial diversity of habitat quality on a stand level as expected. This high within-stand habitat heterogeneity also decreased with increasing age of the most recent disturbance. This suggests that the absence of young successional stages results in the absence of some important elements for biodiversity, for example sun-exposed snags. 4. Synthesis and applications. Our results demonstrate that currently intensifying natural disturbance regime can consequently result in a lower habitat heterogeneity. In managed spruce forests after natural disturbances, we recommend at least the partial retention of biological legacies to preserve habitat heterogeneity and to avoid uniform and dense plantations resulting in a greater homogenisation. To emulate the natural disturbances pattern, spruce forests should be managed with a wide range of harvested patches of the size limited by a local natural disturbance regime creating spatial heterogeneity.
Permanent Link: https://hdl.handle.net/11104/0342551

0572031 - ÚI 2024 RIV GB eng J - Journal Article
Fernández-Duque, David - Shafer, P. - Towsner, H. - Yokoyama, K.
Metric fixed point theory and partial impredicativity.
Philosophical Transactions of the Royal Society A-Mathematical Physical and Engineering Sciences. Roč. 381, č. 2248 (2023), č. článku 20220012. ISSN 1364-503X. E-ISSN 1471-2962
Institutional support: RVO:67985807
Keywords : computability theory * reverse mathematics * second-order arithmetic * fixed-point theorems * variational principles
Impact factor: 4.019, year: 2021
Method of publishing: Limited access
https://dx.doi.org/10.1098/rsta.2022.0012
DOI: 10.1098/rsta.2022.0012
We show that the Priess-Crampe & Ribenboim fixed point theorem is provable in RCA0. Furthermore, we show that Caristi's fixed point theorem for both Baire and Borel functions is equivalent to the transfinite leftmost path principle, which falls strictly between ATR0 and p11-CA0. We also exhibit several weakenings of Caristi's theorem that are equivalent to WKL0 and to ACA0.This article is part of the theme issue 'Modern perspectives in Proof Theory'.
Permanent Link: https://hdl.handle.net/11104/0342867
Research data: Preprint at ArXiv.org

0572117 - ÚI 2024 GB eng J - Journal Article
Ferenz, Nicholas
First-Order Relevant Reasoners in Classical Worlds.
Review of Symbolic Logic. Online 21 March 2023 (2023), č. článku PII S1755020323000096. ISSN 1755-0203. E-ISSN 1755-0211
Institutional support: RVO:67985807
Keywords : relevant logic * epistemic logic * non-Tarskian quantifiers * first-order epistemic logic
Impact factor: 1.217, year: 2021
Method of publishing: Limited access
DOI: 10.1017/S1755020323000096
Sedlár and Vigiani [18] have developed an approach to propositional epistemic logics wherein (i) an agent's beliefs are closed under relevant implication and (ii) the agent is located in a classical possible world (i.e., the non-modal fragment is classical). Here I construct first-order extensions of these logics using the non-Tarskian interpretation of the quantifiers introduced by Mares and Goldblatt [12], and later extended to quantified modal relevant logics by Ferenz [6]. Modular soundness and completeness are proved for constant domain semantics, using non-general frames with Mares–Goldblatt truth conditions. I further detail the relation between the demand that classical possible worlds have Tarskian truth conditions and incompleteness results in quantified relevant logics.
Permanent Link: https://hdl.handle.net/11104/0342944

0572274 - ÚI 2024 J - Journal Article
Böhm, A. - Lauko, V. - Dostálová, K. - Balanová, I. - Varga, I. - Bezák, B. - Jajcay, Nikola - Moravčík, R. - Lazurová, L. - Slezák, P. - Mojto, V. - Kollárová, M. - Petríková, K. - Daňová, K. - Zeman, M.
In-vitro antiplatelet effect of melatonin in healthy individuals and patients with type 2 diabetes mellitus.
Journal of Endocrinological Investigation. Online 06 May 2023 (2023). ISSN 0391-4097. E-ISSN 1720-8386
Institutional support: RVO:67985807

Keywords : Melatonin * Acute myocardial infarction * Circadian variation * Diabetes mellitus * Platelet aggregation
OECD category: Cardiac and Cardiovascular systems
Impact factor: 5.467, year: 2021
Method of publishing: Open access
https://dx.doi.org/10.1007/s40618-023-02102-7
DOI: 10.1007/s40618-023-02102-7
PURPOSE: The incidence of acute myocardial infarctions (AMI) shows circadian variation typically peaking during morning hours with a decline at night. However, this variation does not occur in patients with diabetes mellitus (DM). The night's decline of AMI may be partially explained by melatonin-related platelet inhibition. Whether this effect is absent in diabetic patients is unknown. The aim was to study the effect of melatonin on in-vitro platelet aggregation in healthy individuals and patients with type 2 DM. METHODS: Platelet aggregation was measured in blood samples from healthy individuals (n = 15) and type 2 DM patients (n = 15) using multiple electrode aggregometry. Adenosine diphosphate (ADP), arachidonic acid (ASPI) and thrombin (TRAP) were used as agonists. Aggregability for each subject was tested after adding melatonin in two concentrations. RESULTS: In healthy individuals, melatonin inhibited platelet aggregation in both higher (10–5 M) and lower concentrations (10–9 M) induced by ADP, ASPI, and TRAP ($p < 0.001$, $p = 0.002$, $p = 0.029$, respectively). In DM patients, melatonin did not affect platelet aggregation in both concentrations induced by ADP, ASPI, and TRAP. Melatonin decreased platelet aggregation induced by ADP, ASPI, and TRAP significantly more in healthy individuals compared to patients with DM. ($p = 0.005$, $p = 0.045$ and $p = 0.048$, respectively). CONCLUSION: Platelet aggregation was inhibited by melatonin in healthy individuals. In-vitro antiplatelet effect of melatonin in type 2 DM patients is significantly attenuated.
Permanent Link: https://hdl.handle.net/11104/0343021

0572469 - ÚI 2024 eng J - Journal Article
Hladká, Adéla - Martinková, Patrícia - Magis, D.
Combining Item Purification and Multiple Comparison Adjustment Methods in Detection of Differential Item Functioning.
Multivariate Behavioral Research. Online 23 May 2023 (2023). ISSN 0027-3171. E-ISSN 1532-7906
R&D Projects: GA ČR(CZ) GA21-03658S
Institutional support: RVO:67985807
Keywords : differential item functioning * item purification * multiple comparison adjustments
OECD category: Statistics and probability
Impact factor: 3.085, year: 2021
Method of publishing: Limited access
https://dx.doi.org/10.1080/00273171.2023.2205393
DOI: 10.1080/00273171.2023.2205393
Many of the differential item functioning (DIF) detection methods rely on a principle of testing for DIF item by item, while considering the rest of the items or at least some of them being DIF-free. Computational algorithms of these DIF detection methods involve the selection of DIF-free items in an iterative procedure called item purification. Another aspect is the need to correct for multiple comparisons, which can be done with a number of existing multiple comparison adjustment methods. In this article, we demonstrate that implementation of these two controlling procedures together may have an impact on which items are detected as DIF items. We propose an iterative algorithm combining item purification and adjustment for multiple comparisons. Pleasant properties of the newly proposed algorithm are shown with a simulation study. The method is demonstrated on a real data example.
Permanent Link: https://hdl.handle.net/11104/0343130

0571016 - ÚI 2024 RIV CH eng J - Journal Article

Chao, T. F. - Unverdorben, M. - Kirchhof, P. - Koretsune, Y. - Yamashita, T. - Crozier, R. A. - Pecen, Ladislav - Chen, C. - Borrow, A. P. - De Caterina, R.

Prescribing Patterns and Outcomes of Edoxaban in Atrial Fibrillation: One-Year Data from the Global ETNA-AF Program.

Journal of Clinical Medicine. Roč. 12, č. 5 (2023), č. článku 1870. E-ISSN 2077-0383

Institutional support: RVO:67985807

Keywords : edoxaban * non-vitamin K antagonist oral anticoagulants * dosing * ETNA-AF * registry * real-world data

Impact factor: 4.964, year: 2021

Method of publishing: Open access

https://dx.doi.org/10.3390/jcm12051870

DOI: 10.3390/jcm12051870

Non-recommended dosing occurs in ~25–50% of non-vitamin K antagonist oral anticoagulant prescriptions, with limited data for edoxaban. We analyzed edoxaban dosing patterns in atrial fibrillation patients from the Global ETNA-AF program, relating patterns to baseline characteristics and 1-year clinical outcomes. The following dosing groups were compared: non-recommended 60 mg ("overdosed") vs. recommended 30 mg, non-recommended 30 mg ("underdosed") vs. recommended 60 mg. Most (22,166/26,823, 82.6%) patients received recommended doses. Non-recommended dosing was more frequent near label-specified dose-reduction thresholds. Ischemic stroke (IS, HR 0.85, 95% CI 0.50–1.47, p = 0.6) and major bleeding (MB, HR 1.47, 95% CI 0.97–2.71, p = 0.07) did not differ between recommended 60 mg and "underdosed" groups, whereas all-cause (HR 1.61, 95% CI 1.23–2.08, p = 0.0003) and cardiovascular deaths (HR 1.61, 95% CI 1.11–2.38, p = 0.01) were higher in the "underdosed" group. Compared with recommended 30 mg, the "overdosed" group had lower IS (HR 0.51, 95% CI 0.28–0.98, p = 0.04) and all-cause death (HR 0.74, 95% CI 0.55–0.98, p = 0.03) without higher MB (HR 0.74, 95% CI 0.46–1.22, p = 0.2). In conclusion: non-recommended dosing was infrequent, but more common near dose-reduction thresholds. "Underdosing" was not associated with better clinical outcomes. The "overdosed" group had lower IS and all-cause death without higher MB.

Permanent Link: https://hdl.handle.net/11104/0342332

0571193 - ÚI 2024 CZ cze J - Journal Article

Pejčoch, M. - Kříž, B. - Malý, Marek

Promořenost hantaviry ve dvou oblastech s přírodními ohnisky hantavirů.

Praktický lékař. Roč. 90, č. 3 (2010), s. 167-170. ISSN 0032-6739

Keywords : hantaviry * Puumala * seroprevalence * Česká republika

Všechny 3 viry mohou nakazit člověka a vyvolat u něho onemocnění nephropathia epidemica různé závažnosti. V okrese Prachatice se vyskytla epidemie onemocnění vyvolaných virem Puumala. Vyšetřili jsme proto náhodně vybraný soubor sér 1081 osob žijících v přilehlých oblastech jižních a jihozápadních Čech archivovaných v sérové bance SZÚ v Praze. Paralelně jsme vyšetřili séra 423 osob ze Vsetínska, kde byly zaznamenány 4 případy onemocnění vyvolaných hantaviry. Promořenost hantaviry činila v Čechách 1,76 %, na Vsetínsku 1,18 %. To odpovídá výsledkům jiných studií z území ČR. V uvedených oblastech není tedy plošné riziko nákazy hantaviry, ale nákazou jsou ohroženy osoby, které vniknou do přírodního ohniska hantavirů individuálně při výkonu povolání nebo při zájmové činnosti.

Permanent Link: https://hdl.handle.net/11104/0342465

0571168 - ÚI 2024 RIV CH eng J - Journal Article
Jajcay, Nikola - Bezák, B. - Segev, A. - Matetzky, S. - Janková, J. - Spartalis, M. - El Tahlawi, M. - Guerra, F. - Friebel, J. - Thevathasan, T. - Berta, I. - Pölzl, L. - Nägele, F. - Pogran, E. - Cader, F. A. - Jarakovic, M. - Gollmann-Tepeköylü, C. - Kollárová, M. - Petríková, K. - Tica, O. - Krychtiuk, K. A. - Tavazzi, G. - Skurk, C. - Huber, K. - Böhm, A.
Data processing pipeline for cardiogenic shock prediction using machine learning.
Frontiers in Cardiovascular Medicine. Roč. 10, 23 March 2023 (2023), č. článku 1132680. E-ISSN 2297-055X
Institutional support: RVO:67985807
Keywords : classification * machine learning * missing data imputation * processing pipeline * prediction model * cardiogenic shock
OECD category: Cardiac and Cardiovascular systems
Impact factor: 5.848, year: 2021
Method of publishing: Open access
https://dx.doi.org/10.3389/fcvm.2023.1132680
DOI: 10.3389/fcvm.2023.1132680
INTRODUCTION: Recent advances in machine learning provide new possibilities to process and analyse observational patient data to predict patient outcomes. In this paper, we introduce a data processing pipeline for cardiogenic shock (CS) prediction from the MIMIC III database of intensive cardiac care unit patients with acute coronary syndrome. The ability to identify high-risk patients could possibly allow taking pre-emptive measures and thus prevent the development of CS. METHODS: We mainly focus on techniques for the imputation of missing data by generating a pipeline for imputation and comparing the performance of various multivariate imputation algorithms, including k-nearest neighbours, two singular value decomposition (SVD)—based methods, and Multiple Imputation by Chained Equations. After imputation, we select the final subjects and variables from the imputed dataset and showcase the performance of the gradient-boosted framework that uses a tree-based classifier for cardiogenic shock prediction. RESULTS: We achieved good classification performance thanks to data cleaning and imputation (cross-validated mean area under the curve 0.805) without hyperparameter optimization. CONCLUSION: We believe our pre-processing pipeline would prove helpful also for other classification and regression experiments.
Permanent Link: https://hdl.handle.net/11104/0342448

0572177 - ÚI 2024 RIV CH eng J - Journal Article
Wurst, Z. - Birčák Kuchtová, B. - Křemen, J. - Lahutsina, A. - Ibrahim, I. - Tintěra, J. - Bartoš, A. - Brabec, Marek - Rai, T. - Zach, P. - Musil, V. - Olympiou, N. - Mrzílková, J.
Basal Ganglia Compensatory White Matter Changes on DTI in Alzheimer's Disease.
Cells. Roč. 12, č. 9 (2023), č. článku 1220. E-ISSN 2073-4409
Institutional support: RVO:67985807
Keywords : DTI * Alzheimer's disease * basal ganglia * white matter * compensatory changes
OECD category: Statistics and probability
Impact factor: 7.666, year: 2021
Method of publishing: Open access
https://dx.doi.org/10.3390/cells12091220
DOI: 10.3390/cells12091220
The volume reduction of the gray matter structures in patients with Alzheimer's disease is often accompanied by an asymmetric increase in the number of white matter fibers located close to these structures. The present study aims to investigate the white matter structure changes in the motor basal ganglia in Alzheimer's disease patients compared to healthy controls using diffusion tensor imaging. The amounts of tracts, tract length, tract volume, quantitative anisotropy, and general fractional anisotropy were measured in ten patients with Alzheimer's disease and ten healthy controls. A significant decrease in the number of tracts and general fractional anisotropy was found in patients

with Alzheimer's disease compared to controls in the right caudate nucleus, while an increase was found in the left and the right putamen. Further, a significant decrease in the structural volume of the left and the right putamen was observed. An increase in the white matter diffusion tensor imaging parameters in patients with Alzheimer's disease was observed only in the putamen bilaterally. The right caudate showed a decrease in both the diffusion tensor imaging parameters and the volume in Alzheimer's disease patients. The right pallidum showed an increase in the diffusion tensor imaging parameters but a decrease in volume in Alzheimer's disease patients.
Permanent Link: https://hdl.handle.net/11104/0342952
Research data: Supplementary material (MDPI)

0572210 - ÚI 2024 RIV US eng J - Journal Article
Kathpalia, Aditi - Nagaraj, N.
Granger causality for compressively sensed sparse signals.
Physical Review E. Roč. 107, č. 3 (2023), č. článku 034308. ISSN 2470-0045. E-ISSN 2470-0053
R&D Projects: GA ČR(CZ) GA19-16066S
Grant - others: AV ČR(CZ) AP1901
Program: Akademická prémie - Praemium Academiae
Institutional support: RVO:67985807
Keywords : Granger causality * compressed sensing * sparse signals * circulant * toeplitz * structured sensing matrices * neural spike train
OECD category: Applied mathematics
Impact factor: 2.707, year: 2021
Method of publishing: Limited access
https://dx.doi.org/10.1103/PhysRevE.107.034308
DOI: 10.1103/PhysRevE.107.034308
Compressed sensing is a scheme that allows for sparse signals to be acquired, transmitted, and stored using far fewer measurements than done by conventional means employing the Nyquist sampling theorem. Since many naturally occurring signals are sparse (in some domain), compressed sensing has rapidly seen popularity in a number of applied physics and engineering applications, particularly in designing signal and image acquisition strategies, e.g., magnetic resonance imaging, quantum state tomography, scanning tunneling microscopy, and analog to digital conversion technologies. Contemporaneously, causal inference has become an important tool for the analysis and understanding of processes and their interactions in many disciplines of science, especially those dealing with complex systems. Direct causal analysis for compressively sensed data is required to avoid the task of reconstructing the compressed data. Also, for some sparse signals, such as for sparse temporal data, it may be difficult to discover causal relations directly using available data-driven or model-free causality estimation techniques. In this work, we provide a mathematical proof that structured compressed sensing matrices, specifically circulant and Toeplitz, preserve causal relationships in the compressed signal domain, as measured by Granger causality (GC). We then verify this theorem on a number of bivariate and multivariate coupled sparse signal simulations which are compressed using these matrices. We also demonstrate a real world application of network causal connectivity estimation from sparse neural spike train recordings from rat prefrontal cortex. In addition to demonstrating the effectiveness of structured matrices for GC estimation from sparse signals, we also show a computational time advantage of the proposed strategy for causal inference from compressed signals of both sparse and regular autoregressive processes as compared to standard GC estimation from original signals.
Permanent Link: https://hdl.handle.net/11104/0342984
Research data: Preprint - ArXiv.org

0571286 - ÚI 2024 eng J - Journal Article

Šípek jr., A. - Gregor, V. - Šípek, A. - Klaschka, Jan - Malý, Marek - Calda, P.

The Reduced Use of Invasive Procedures Leads to a Change of Frequencies of Prenatally Detected Chromosomal Aberrations: Population Data From the Years 2012-2016 (Note).

Obstetrical & Gynecological Survey. Roč. 78, č. 3 (2023), s. 133-135. ISSN 0029-7828. E-ISSN 1533-9866

Impact factor: 3.015, year: 2021 DOI: 10.1097/01.ogx.0000923040.17449.2c

Prenatal chromosomal aberration screening mainly focuses on the identification of the autosomal trisomy of chromosomes 21, 18, and 13 (Down syndrome, Edwards syndrome, and Patau syndrome, respectively). This screening may be often combined with other first-semester screenings to promote earlier detection of other pregnancy complications, including chromosomal aberrations. In the Czech Republic, there is no unified policy for prenatal screening. The main prenatal diagnostic centers provide combined prenatal screening in the first semester, whereas some conduct biochemical screening in the second trimester. Those with positive screening results or abnormal ultrasound are offered invasive diagnostic procedures, such as chorionic villus sampling (CVS) or amniocentesis, along with additional genetic testing. Whereas the number of amniocenteses has declined, the number of CVS is increasing. The aim of this study was to examine the results of chromosomal aberrations screening in a population with a high rate of first-trimester screening and low rate of noninvasive prenatal testing. This was a population-based study, using data from the National Registry of Congenital Anomalies of the Czech Republic from 2012 to 2016. Included were all cases of prenatally diagnosed chromosomal aberrations. The proportions of the autosomal trisomies and other chromosomal aberrations were calculated and compared. The denominator was the number of live births per year. A total of 3009 prenatally diagnosed cases of chromosomal aberrations were identified during the study period. The most common aberrations were the major autosomal trisomies (1885 cases [62.6%]). The number of invasive prenatal diagnostic procedures decreased from 11,517 cases (1099.54 per 10,000) to 7042 cases (622.73 per 10,000) during the study period. From 2012 to 2016, the number of prenatally diagnosed major autosomal trisomies increased (329 cases [30.86 per 10,000] vs 423 cases [37.41 per 10,000], respectively; Poisson regression: $P = 0.014$), and the number of other aberrations decreased (246 cases [23.07 per 10,000] vs 217 cases [19.19 per 10,000], respectively; Poisson regression: $P = 0.017$). There was a highly statistically significant increase of 57.22% in 2012 to 66.09% in 2016 in the rate of the major autosomal trisomies group (logistic regression: $P < 0.001$). The study found that, during a 5-year period, when invasive prenatal diagnostic procedures declined, there was also a decrease in the number of nonmajor chromosomal aberrations. Noninvasive prenatal testing was not shown to impact these data.

Permanent Link: https://hdl.handle.net/11104/0342547

0571299 - ÚI 2024 RIV NL eng J - Journal Article

Yamamoto, Kentarô

The Small Index Property of the Fraïssé limit of Finite Heyting Algebras.

Journal of Algebra. Roč. 628, 15 August 2023 (2023), s. 382-391. ISSN 0021-8693. E-ISSN 1090-266X

Institutional support: RVO:67985807

Keywords : Small index property * Automorphism groups * Fraïssé limits * Heyting algebras * Polish groups

OECD category: Pure mathematics

Impact factor: 0.908, year: 2021

Method of publishing: Limited access

DOI: 10.1016/j.jalgebra.2023.03.020

We show that if a subgroup of the automorphism group of the Fraïssé limit of finite Heyting algebras has a countable index, then it lies between the pointwise and setwise stabilizer of some finite set.

Permanent Link: https://hdl.handle.net/11104/0342555

0572336 - ÚI 2024 US eng J - Journal Article
Rehák Bučková, Barbora - Kala, D. - Kořenek, Jakub - Matušková, V. - Kumpošt, Vojtěch - Svobodová, L. - Otáhal, Jakub - Škoch, A. - Šulc, V. - Olšerová, A. - Vyhnálek, M. - Janský, P. - Tomek, A. - Marusič, P. - Jiruška, P. - Hlinka, Jaroslav
Structural connectivity-based predictors of cognitive impairment in stroke patients attributable to aging.
PLoS ONE. Roč. 18, č. 4 (2023), č. článku e0280892. ISSN 1932-6203. E-ISSN 1932-6203
R&D Projects: GA MZd(CZ) NV17-28427A
Grant - others: AV ČR(CZ) StrategieAV21/1; AV ČR(CZ) StrategieAV21/26
Program: StrategieAV; StrategieAV
Institutional support: RVO:67985807 ; RVO:67985823
OECD category: Neurosciences (including psychophysiology
Impact factor: 3.752, year: 2021
Method of publishing: Open access
https://dx.doi.org/10.1371/journal.pone.0280892
DOI: 10.1371/journal.pone.0280892
Despite the rising global burden of stroke and its socio-economic implications, the neuroimaging predictors of subsequent cognitive impairment are still poorly understood. We address this issue by studying the relationship of white matter integrity assessed within ten days after stroke and patients' cognitive status one year after the attack. Using diffusion-weighted imaging, we apply the Tract-Based Spatial Statistics analysis and construct individual structural connectivity matrices by employing deterministic tractography. We further quantify the graph-theoretical properties of individual networks. The Tract-Based Spatial Statistic did identify lower fractional anisotropy as a predictor of cognitive status, although this effect was mostly attributable to the age-related white matter integrity decline. We further observed the effect of age propagating into other levels of analysis. Specifically, in the structural connectivity approach we identified pairs of regions significantly correlated with clinical scales, namely memory, attention, and visuospatial functions. However, none of them persisted after the age correction. Finally, the graph-theoretical measures appeared to be more robust towards the effect of age, but still were not sensitive enough to capture a relationship with clinical scales. In conclusion, the effect of age is a dominant confounder especially in older cohorts, and unless appropriately addressed, may falsely drive the results of the predictive modelling.
Permanent Link: https://hdl.handle.net/11104/0343075

0572279 - ÚI 2024 GB eng J - Journal Article
Sherratt, K. - Gruson, H. - Grah, R. - Tuček, Vít - Šmíd, Martin - Zajíček, Milan ... Total 129 authors
Predictive performance of multi-model ensemble forecasts of COVID-19 across European nations.
eLife. Online First April 21, č. 2023 (2023). ISSN 2050-084X. E-ISSN 2050-084X
Institutional support: RVO:67985807 ; RVO:67985556
OECD category: Computer sciences, information science, bioinformathics (hardware development to be 2.2, social aspect to be 5.8); Statistics and probability (UTIA-B)
Impact factor: 8.713, year: 2021
Method of publishing: Open access
DOI: 10.7554/eLife.81916
BACKGROUND: Short-term forecasts of infectious disease contribute to situational awareness and capacity planning. Based on best practice in other fields and recent insights in infectious disease epidemiology, one can maximise forecasts' predictive performance by combining independent models into an ensemble. Here we report the performance of ensemble predictions of COVID-19 cases and deaths across Europe from March 2021 to March 2022. METHODS: We created the European COVID-

19 Forecast Hub, an online open-access platform where modellers upload weekly forecasts for 32 countries with results publicly visualised and evaluated. We created a weekly ensemble forecast from the equally-weighted average across individual models' predictive quantiles. We measured forecast accuracy using a baseline and relative Weighted Interval Score (rWIS). We retrospectively explored ensemble methods, including weighting by past performance. RESULTS: We collected weekly forecasts from 48 models, of which we evaluated 29 models alongside the ensemble model. The ensemble had a consistently strong performance across countries over time, performing better on rWIS than 91% of forecasts for deaths (N=763 predictions from 20 models), and 83% forecasts for cases (N=886 predictions from 23 models). Performance remained stable over a 4-week horizon for death forecasts but declined with longer horizons for cases. Among ensemble methods, the most influential choice came from using a median average instead of the mean, regardless of weighting component models. CONCLUSIONS: Our results support combining independent models into an ensemble forecast to improve epidemiological predictions, and suggest that median averages yield better performance than methods based on means. We highlight that forecast consumers should place more weight on incident death forecasts than case forecasts at horizons greater than two weeks. FUNDING: European Commission, Ministerio de Ciencia, Innovación y Universidades, FEDER; Agència de Qualitat i Avaluació Sanitàries de Catalunya; Netzwerk Universitätsmedizin; Health Protection Research Unit; Wellcome Trust; European Centre for Disease Prevention and Control; Ministry of Science and Higher Education of Poland; Federal Ministry of Education and Research; Los Alamos National Laboratory; German Free State of Saxony; NCBiR; FISR 2020 Covid-19 I Fase; Spanish Ministry of Health / REACT-UE (FEDER); National Institutes of General Medical Sciences; Ministerio de Sanidad/ISCIII; PERISCOPE European H2020; PERISCOPE European H2021; InPresa; National Institutes of Health, NSF, US Centers for Disease Control and Prevention, Google, University of Virginia, Defense Threat Reduction Agency.
Permanent Link: https://hdl.handle.net/11104/0343023
Research data: Github

0571220 - ÚI 2024 RIV RS eng C - Conference Paper (international conference)
Kalina, Jan - Soukup, Lubomír
History of Statistical Thinking: From Uncertainty to Uncertain Knowledge.
PaKSoM 2022: Proceedings of the 4th Virtual International Conference Path to a Knowledge Society-Managing Risks and Innovation. Niš / Belgrade: Complex Systems Research Centre and Mathematical Institute of the Serbian Academy of Sciences and Arts, 2023 - (Stanković, M.; Nikolić, V.), s. 497-504. ISBN 978-86-82602-00-2.
[PaKSoM 2022: The Virtual International Conference Path to a Knowledge Society-Managing Risks and Innovation /4./. Virtual (RS), 08.12.2022-09.12.2022]
Institutional support: RVO:67985807 ; RVO:67985556
Keywords : history of statistics * information and knowledge * uncertainty * probability * data analysis * methodology of science
OECD category: Statistics and probability; Statistics and probability (UTIA-B)
https://paksom.cosrec.org/wp-content/uploads/2023/03/PaKSoM_2022.pdf
Currently, an enormous amount of data is available to the humankind in various fields and it is exactly the data (information) which may be transferred to practically useful knowledge. The data are subject to uncertainty and their analysis, i.e. extracting knowledge from the data, requires statistical thinking and statistical methods. Thus, the concept of the knowledge society requiring reliable knowledge to be available to all citizens is heavily depending on statistics. This paper is devoted to an overview of the historical development of basic probabilistic and statistical concepts. Such overview is intended to encourage readers to think anew about statistical ideas in the light of their historical development. The paper recalls that any knowledge obtained by statistical methods is highly probable but not absolutely certain.
Permanent Link: https://hdl.handle.net/11104/0342488

0571169 - ÚI 2024 RIV DE eng C - Conference Paper (international conference)
Duintjer Tebbens, Jurjen - Lanzendörfer, M. - Matonoha, Ctirad - Papáček, Štěpán
Preconditioning for the integration of a spatiotemporal pharmacodynamic system.
Proceedings in Applied Mathematics and Mechanics. Weinheim: Wiley, 2023 - (Böhm, C.; Mang, K.; Markert, B.; Reese, S.; Schmidtchen, M.; Waimann, J.; Kaliske, M.), č. článku e202200268. ISSN 1617-7061.
[92nd Annual Meeting of the International Association of Applied Mathematics and Mechanics. Aachen (DE), 15.08.2022-19.08.2022]
R&D Projects: GA ČR(CZ) GA21-03689S
Institutional support: RVO:67985807 ; RVO:67985556
Keywords : Pharmacodynamic modeling * ODEs * PDEs * pharmacotherapy * preconditioning * spatial resolution
OECD category: Pure mathematics; Pure mathematics (UTIA-B)
Method of publishing: Limited access
https://dx.doi.org/10.1002/pamm.202200268
DOI: 10.1002/pamm.202200268
We address efficient modeling of the intracellular action of a drug binding to the nuclear pregnane X receptor. The binded complex enters the cell nucleus and acts on DNA, resulting in enhanced production of an enzyme which metabolizes, among others, co-administered drugs. Pharmacodynamic modeling is traditionally based on a compartmental approach, which simplifies the complex processes in the human body through the definition of a small number of compartments representing organs, tissues, cells, cytoplasm or abstract units. Inside a compartment, the concentrations of all substances are assumed to be distributed homogeneously, i.e. there is no spatial dependence. They lead to a system of ODEs for the time-dependence of the concentrations of the active substances. We will present an extension of a model from the literature for the action of the tuberculose-drug Rifampicin. The extension consists of a first attempt to add spatial resolution for substances that are active in the cytoplasm. Spatial resolution can be benecifial to analyze important issues like, among others, local exceeding of toxic drug levels, delay of transport and drug-drug interactions. We address efficient solution of the linear systems arising when numerically integrating the resulting PDE's and consider some preconditioning techniques based on properties of the underlying biochemical network.
Permanent Link: https://hdl.handle.net/11104/0342449

0571279 - ÚI 2024 RIV CZ eng C - Conference Paper (international conference)
Řezníček, Hynek - Geletič, Jan - Bureš, Martin - Krč, Pavel - Resler, Jaroslav - Vrbová, Kateřina - Trush, Arsenii - Michálek, Petr - Beneš, L. - Sühring, M. ... Total 11 authors
Different Boundary Conditions For LES Solver PALM 6.0 Used for ABL in Tunnel Experiment.
Programs and Algorithms of Numerical Mathematics 21. Vol. 21. Prague: Institute of Mathematics CAS, 2023 - (Chleboun, J.; Kůs, P.; Papež, J.; Rozložník, M.; Segeth, K.; Šístek, J.), s. 209-218. ISBN 978-80-85823-73-8.
[Programs and Algorithms of Numerical Mathematics 21, PANM 21 /2022/. Jablonec nad Nisou (CZ), 19.06.2022-24.06.2022]
R&D Projects: GA ČR(CZ) GA22-08786S
Grant - others: AV ČR(CZ) StrategieAV21/23; AV ČR(CZ) StrategieAV21/3
Program: StrategieAV; StrategieAV
Institutional support: RVO:67985807 ; RVO:68378297
Keywords : large eddy simulation * wind tunnel * atmospheric boundary layer * PALM model * turbulence
OECD category: Meteorology and atmospheric sciences
https://panm21.math.cas.cz/sbornik/PANM21_sbornik.pdf
DOI: 10.21136/panm.2022.19

We tried to reproduce results measured in the wind tunnel experiment with a CFD simulation provided by numerical model PALM. A realistic buildings layout from the Prague-Dejvice quarter has been chosen as a testing domain because solid validation campaign for PALM simulation of Atmospheric Boundary Layer (ABL) over this quarter was documented in the past. The question of input data needed for such simulation and capability of the model to capture correctly the inlet profile and its turbulence structure provided by the wind-tunnel is discussed in the study The PALM dynamical core contains a solver for the Navier-Stokes equations. By default, the model uses the Large Eddy Simulation (LES) approach in which the bulk of the turbulent motions is explicitly resolved. It is well validated tool for simulations of the complex air-flow within the real urban canopy and also within its reduced scale provided by wind tunnel experiments. However the computed flow field between the testing buildings did not correspond well to the measured wind velocity in some points. Different setting of the inlet boundary condition was tested but none of them gave completely developed turbulent flow generated by vortex generators and castellated barrier wall place at the entrance of the aerodynamic section of the wind tunnel.
Permanent Link: https://hdl.handle.net/11104/0342541

0571145 - ÚI 2024 RIV CH eng C - Conference Paper (international conference)
Sedlár, Igor
On the Complexity of Kleene Algebra with Domain.
Relational and Algebraic Methods in Computer Science. 20th International Conference, RAMiCS 2023 Proceedings.. Cham: Springer, 2023 - (Glück, R.; Santocanale, L.; Winter, M.), s. 208-223. Lecture Notes in Computer Science, 13896. ISBN 978-3-031-28082-5.
[RAMiCS 2023: International Conference on Relational and Algebraic Methods in Computer Science /20./. Augsburg (DE), 03.04.2023-06.04.2023]
Institutional support: RVO:67985807
Keywords : Complexity * Kleene algebra * Kleene algebra with domain * Propositional dynamic logic * Test algebra
OECD category: Computer sciences, information science, bioinformathics (hardware development to be 2.2, social aspect to be 5.8)
https://dx.doi.org/10.1007/978-3-031-28083-2_13
DOI: 10.1007/978-3-031-28083-2_13
We prove that the equational theory of Kleene algebra with domain is EXPTIME-complete. Our proof makes essential use of Hollenberg's equational axiomatization of program equations valid in relational test algebra. We also show that the equational theory of Kleene algebra with domain coincides with the equational theory of *-continuous Kleene algebra with domain.
Permanent Link: https://hdl.handle.net/11104/0342436

0572204 - ÚI 2024 GB A - Abstract
Ameri, P. - Schnabel, R. B. - Pecen, Ladislav - Diemberger, I. - Gwechenberger, M. - Siller-Matula, J. M. - Kirchhof, P. - De Caterina, R.
Two-year outcomes of patients with atrial fibrillation and heart failure: the ETNA-AF-Europe registry.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 619-619. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342973

0572263 - ÚI 2024 NL eng A - Abstract
Brkić, J. - Kummer, I. - Antonenko, O. - Sri, A. B. - Bandari, D. K. - Vaculová, G. - Grešáková, S. - Bhagavathula, A. S. - Reissigová, Jindra - Fialová, D.
Comparative results on potentially inappropriate medication use in Czech older people in acute, ambulatory care and community pharmacy practices: results from the INOMED and the EUROAGEISM ESR7 project.
International Journal of Clinical Pharmacy. Roč. 44, č. 6 (2022), s. 1474-1475. ISSN 2210-7703. E-ISSN 2210-7711
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0343016

0572270 - ÚI 2024 NL eng A - Abstract
Brkić, J. - Držaić, M. - Kummer, I. - Hadziabdic, M. O. - Sesto, S. - Tadic, I. - Altiparmak, O. - Okuyan, B. - Bobrova, V. - Volmer, D. - Magátová, A. - Tachkov, K. - Kamusheva, M. - Petrova, G. - Modamio, P. - Marino, E. - Reissigová, Jindra - Fialová, D.
Prescribing patterns of potentially inappropriate medication use in older patients in Europe: the results from the EUROAGEISM H2020 project.
International Journal of Clinical Pharmacy. Roč. 44, č. 6 (2022), s. 1466-1466. ISSN 2210-7703. E-ISSN 2210-7711
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0343020

0572208 - ÚI 2024 GB A - Abstract
De Caterina, R. - Unverdorben, M. - Lee, B.-C. - Yamashita, T. - Lin, W. S. - Wang, C. C. - Pecen, Ladislav - Borrow, A. - Chen, C. - Kirchhof, P.
Real-world effectiveness and safety of edoxaban in patients with and without a history of ischaemic stroke: results from the ETNA-AF programme.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 2702-2702. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342977

0572205 - ÚI 2024 GB A - Abstract
De Vries, T. A. C. - Pecen, Ladislav - Komen, J. J. - Diemberger, I. - Fumagalli, S. - De Groot J. R. - Kirchhof, P. - De Caterina, R.
Perceived frailty and clinical outcomes in men and women with atrial fibrillation treated with edoxaban: insights from the 2-year follow-up of ETNA-AF-Europe.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 2544-2544. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342974

0572203 - ÚI 2024 GB A - Abstract
De Vries, T. A. C. - Pecen, Ladislav - Komen, J. J. - De Groot J. R. - Kirchhof, P. - De Caterina, R.
The association between dyslipidaemia treatment and the risk of clinical events in edoxaban-treated patients with atrial fibrillation: insights from the 2-year follow-up of ETNA-AF-Europe.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 618-618. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342972

0572269 - ÚI 2024 NL eng A - Abstract
Kummer, I. - Lukačišinová, A. - Reissigová, Jindra - Brkić, J. - Fialová, D.
Cardiovascular drug-disease interactions in Czech seniors in ambulatory and acute care: results of the EUROAGEISM H2020 project.
International Journal of Clinical Pharmacy. Roč. 44, č. 6 (2022), s. 1475-1475. ISSN 2210-7703. E-ISSN 2210-7711
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0343018

0572262 - ÚI 2024 NL eng A - Abstract
Kummer, I. - Pekarová, M. - Brkić, J. - Reissigová, Jindra - Fialová, D.
Rational use of statins in the sample of czech seniors assessed during the EUROAGEISM H2020 project.
International Journal of Clinical Pharmacy. Roč. 44, č. 6 (2022), s. 1483-1483. ISSN 2210-7703. E-ISSN 2210-7711
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0343012

0572202 - ÚI 2024 GB A - Abstract
Patti, G. - Pecen, Ladislav - Casalnuovo, G. - Kirchhof, P. - De Caterina, R.
Clinical outcomes in patients with atrial fibrillation with or without concomitant diabetes after two years of edoxaban treatment: ETNA-AF-Europe registry.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 2405-2405. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342971

0572206 - ÚI 2024 GB A - Abstract
Russo, V. - Wang, C. C. - Unverdorben, M. - Yamashita, T. - Pecen, Ladislav - Borrow, A. - Chen, C. - Kirchhof, P. - De Caterina, R.
Two-year effectiveness and safety outcomes in 27,333 edoxaban-treated patients with and without a history of major bleeding from the Global ETNA-AF programme.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 2701-2701. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342975

0572207 - ÚI 2024 GB A - Abstract
Siller-Matula, J. M. - Unverdorben, M. - Wang, C. C. - Koretsune, Y. - Pecen, Ladislav - Borrow, A. - Chen, C. - Kirchhof, P. - De Caterina, R.
The real-world effectiveness and safety of edoxaban treatment in 27,333 Global ETNA-AF programme patients with and without a history of heart failure.
European Heart Journal. Roč. 43, Suppl. 2 (2022), s. 2700-2700. ISSN 0195-668X. E-ISSN 1522-9645
Institutional support: RVO:67985807
Permanent Link: https://hdl.handle.net/11104/0342976