Cerioni, M. - Brabec, Marek - Bače, R. - Bāders, E. - Bončina, A. - Brůna, Josef - Chećko, E. - Cordonnier, T. - de Koning, J. H. C. - Diaci, J. - Dobrowolska, D. - Dountchev, A. - Engelhart, J. - Fidej, G. - Fuhr, M. - Garbarino, M. - Jansons, A. - Keren, S. - Kitenberga, M. - Klopčič, M. - Konôpka, B. - Kopecký, Martin - Köster, K. - Kucbel, S. - Lacombe, E. - Laurent, L. - Leyman, A. - Lingua, E. - Macek, Martin - Maciejewski, Z. - Malandra, F. - Marzano, R. - Metslaid, M. - Morresi, D. - Panayotov, M. - Pawlak, B. - Pittner, J. - Šebeň, V. - Socha, J. - Svoboda, M. - Szwagrzyk, J. - Tsvetanov, N. - Urbinati, C. - Vallet, P. - Van de Kerckhove, P. - Vandekerkhove, K. - Vencurik, J. - Vitali, A. - Vodde, F. - Wild, Jan - Nagel, T. A.

Recovery and resilience of European temperate forests after large and severe disturbances.

Recent observations of tree regeneration failures following large and severe disturbances, particularly under warm and dry conditions, have raised concerns about the resilience of forest ecosystems and their recovery dynamics in the face of climate change. We investigated the recovery of temperate forests in Europe after large and severe disturbance events (i.e., resulting in more than 70% canopy loss in patches larger than 1 ha), with a range of one to five decades since the disturbance occurred. The study included 143 sites of different forest types and management practices that had experienced 28 disturbance events, including windthrow (132 sites), fire (six sites), and bark beetle outbreaks (five sites). We focused on assessing post-disturbance tree density, structure, and composition as key indicators of forest resilience. We compared post-disturbance height-weighted densities with site-specific pre-disturbance densities to qualitatively assess the potential for structural and compositional recovery, overall and for dominant tree species, respectively. Additionally, we analyzed the ecological drivers of post-windthrow tree density, such as forest management, topography, and post-disturbance aridity, using a series of generalized additive models. The descriptive results show that European temperate forests have been resilient to past large and severe disturbances and concurrent climate conditions, albeit with lower resilience to high-severity fire compared with other disturbance agents. Across sites and disturbance agents, the potential for structural recovery was greater than that of compositional recovery, with a large proportion of plots becoming dominated by early-successional species after disturbance. The models showed that increasing elevation and salvage logging negatively affect post-windthrow regeneration, particularly for late-successional species, while pioneer species are negatively affected by increasing summer aridity. These findings provide a key baseline for assessing future recovery and resilience following the recent occurrence of widespread disturbance in the region and in anticipation of future conditions characterized by increasing heat and drought stress.
Permanent Link: https://hdl.handle.net/11104/0351417

0582637 - ÚI 2025 US eng J - Journal Article
Garbe, F. - [Hladký, Jan](#) - Kun, G. - Pekárková, K.
On pattern-avoiding permutons.
Random Structures and Algorithms. Online January 2024 (2024). ISSN 1042-9832. E-ISSN 1098-2418

The theory of limits of permutations leads to limit objects called permutons, which are certain Borel measures on the unit square. We prove that permutons avoiding a given permutation of order k have a particularly simple structure. Namely, almost every fiber of the disintegration of the permuton (say, along the x-axis) consists only of atoms, at most (k-1) many, and this bound is sharp. We use this to give a simple proof of the "permutation removal lemma."
Permanent Link: https://hdl.handle.net/11104/0350714

0582922 - ÚI 2025 eng J - Journal Article
[Bílková, Marta](#) - Frittella, S. - Kozhemiachenko, D. - [Majer, Ondrej](#) - Nazari, S.
Reasoning with belief functions over Belnap–Dunn logic.
Annals of Pure and Applied Logic. Online July 2023 (2024), č. článku 103338.

We design an expansion of Belnap–Dunn logic with belief and plausibility functions that allows non-trivial reasoning with contradictory and incomplete probabilistic information. We also formalise reasoning with non-standard probabilities and belief functions in two ways. First, using a calculus of linear inequalities, akin to the one presented in [23]. Second, as a two-layered modal logic wherein reasoning with evidence (the outer layer) utilises paraconsistent expansions of Łukasiewicz logic. The second approach is inspired by [3]. We prove completeness for both kinds of calculi and show their equivalence by establishing faithful translations in both directions.
Permanent Link: https://hdl.handle.net/11104/0350964

0582790 - ÚI 2025 CZ cze J - Journal Article
Šípek jr., A. - Šípek, A. - Gregor, V. - Friedová, N. - [Klaschka, Jan](#) - [Malý, Marek](#)
Vrozený hydrocefalus v České republice: incidence, poměr pohlaví a prenatální diagnostika.
Aktuální Gynekologie a Porodnictví. Roč. 16 (2024), s. 7-14. ISSN 1803-9588

CÍLE: Retrospektivní epidemiologická analýza četnosti a poměru pohlaví u dětí narozených s diagnózou vrozeného hydrocefalu v České republice v období 1961–2020. METODIKA: V práci jsou využita data z Národního registru vrozených vad vedeného v rámci Registru reprodukčního zdraví v Ústavu zdravotnických informací a statistiky České republiky (ÚZIS ČR) a data z předchozích analýz v rámci grantového projektu našeho kolektivu. Dalším zdrojem dat byly údaje o prenatální diagnostice ze Společnosti lékařské genetiky a genomiky. VÝSLEDKY: V období 1961-2020 se v České republice narodilo více než 7,5 milionu dětí. Z toho u 2572 narozených dětí byl zachycen vrozený hydrocefalus, u 1369 chlapců, u 1185 dívek a v 18 případech bylo pohlaví neznámé/neurčeno. V 677 případech byla diagnóza vrozeného hydrocefalu zjištěna prenatálně a následně byla gravidita z genetické indikace ukončena. Incidence vrozeného hydrocefalu v období 1961-1965 je významně vyšší než v ostatních obdobích. Dále do roku 1995 byl zjištěn sestupný trend a po roce 1995 incidence opět stoupá. Podíl prenatální diagnostiky průběžně stoupal a dosáhl maxima v posledních letech sledovaného období. Z celkového počtu narozených dětí bez vrozených vad bylo 51,22 % chlapců a 48,78 % děvčat. Mezi dětmi narozenými s vrozeným hydrocefalem bylo oproti tomu statisticky významně více chlapců (53,60 %) a méně dívek (46,40 %), P=0,016. Podrobnější analýza ukázala, že poměr pohlaví u narozených s vrozeným hydrocefalem se v průběhu času mění. Podíl chlapců mezi dětmi narozenými s hydrocefalem byl v prvních dvou, stejně jako posledních dvou dekádách oproti dětem bez VV mírně a nevýznamně vyšší. V období 1981–1990 byl podíl chlapců mezi dětmi s danou VV statisticky významně vyšší než mezi dětmi bez VV (cca 56 % vs. 51 %). Naopak v období 1991–2000 byl podíl chlapců mezi dětmi s danou VV lehce a statisticky nevýznamně nižší než mezi dětmi bez VV. ZÁVĚR: Celková incidence vrozeného hydrocefalu v průběhu sledovaného období klesla na nejnižší hodnoty na začátku 90. let minulého století, pak se opět zvyšovala. Za zvýšením počtu případů stojí s největší pravděpodobností rozvoj prenatální i postnatální ultrazvukové diagnostiky. Dále jsme prokázali, že mezi dětmi s hydrocefalem bylo statisticky významně více chlapců oproti dětem narozeným bez VV.
Permanent Link: https://hdl.handle.net/11104/0350837

Anwar, S. - Yaseen, M. - Yaseen, Muhammad - Latif, Yasir
Modeling spatial distribution of earthquake epicenters using inhomogeneous Log-Gaussian Cox point process.
Modeling Earth Systems and Environment.. Online 01 February 2024 (2024)

This paper explores the applicability of Inhomogeneous Log-Gaussian Cox point process to a complex spatial mechanism generating the tightly clustered locations of an earthquake aftershocks. The data constitutes the deadly 2023-Türkiye earthquake of magnitude 7.8 and its aftershocks of magnitudes as large as 7.5. Locations of active tectonic faults and the plate boundaries marked within the study area provide useful covariate information for explaining the aftershocks distribution pattern in 2-D spatial domain. The fitted Inhomogeneous Log-Gaussian Cox Point Process (LGCP) model is able to successfully account for this information. Intensity function of the model serves as a suitable choice to describe the intricate spatial mechanism underlying the earthquakes pattern generation. The available covariates information improves the performance of the fitted LGCP model in describing spatial variation of the density of earthquakes in terms of the distinct spatial features of the seismic region.
Permanent Link: https://hdl.handle.net/11104/0351398

0583807 - BC 2024 RIV NL eng J - Journal Article

Říha, Milan - **Prchalová, Marie** - **Brabec, Marek** - **Draštík, Vladislav** - **Muška, Milan** - **Tušer, Michal** - **Bartoň, Daniel** - **Blabolil, Petr** - **Čech, Martin** - **Frouzová, Jaroslava** - **Holubová, Michaela** - **Jůza, Tomáš** - **Moraes, Karlos Ribeiro de** - **Rabaneda-Bueno, Rubén** - **Sajdlová, Zuzana** - Souza, A.T. - **Šmejkal, Marek** - **Vašek, Mojmír** - **Vejřík, Lukáš** - **Vejříková, Ivana** - **Peterka, Jiří** - **Kubečka, Jan**

Calibration of fish biomass estimates from gillnets: Step towards broader application of gillnet data.
Ecological Indicators. Roč. 153, May (2023), č. článku 110425. ISSN 1470-160X. E-ISSN 1872-7034

Fish are an important component of aquatic ecosystems, thus representative and reliable assessments of their population variables are essential for a variety of ecological applications, management and conservation. Determining Fish Density per actual Spatial Unit (volume or area, FDSU) as a measure of absolute fish quantity is of particular interest. Gillnets are undoubtedly one of the most common and important methods for assessing fish populations in large lentic waters. However, direct calculating of FDSU from gillnet catches is impossible because of the passive nature of this method, and to date there is no reliable model for calculating FDSU from gillnet catches.This weakness largely limits the use of gillnet data for applications requiring FDSU estimates. The aim of this study was to calibrate gillnet catches using FDSU obtained by active methods (beach seine nets and hydroacoustics) to develop a tool for assessing FDSU from gillnet catches. To achieve this goal, we compared gillnet biomass to fish biomass estimated from the active methods, both of which cover similar spatiotemporal niches. This comparison was performed using a statistical approach based on the recognition of non-negligible random measurement error in both the explanatory (active methods) and response (gillnets) variables.We found a strong positive linear relationship between fish biomasses sampled with gillnets and with active methods. The slope of the fitted linear model was similar when comparing gillnets with the two active methods. The statistical method used allowed for the inclusion of error in the biomass estimates with gillnets and active methods, refining the credible intervals of the estimated relationship. The effect of gillnet effort on model accuracy was simulated to show how increased effort narrows the credible interval. Finally, comparison with previously published relationships revealed a large but explainable discrepancy between our model and previous models.Our study showed that conversion of gillnet biomass to biomass per actual spatial unit is possible. The effective sampling area of one square meter of gillnet was determined to be 8 m2 of waterbody surface area when European standard 12 mesh-sizes gillnets are used, and 5 m2 when four larger meshes are added to the European standard gillnets. Our model further stressed the impact of increased sampling effort on reducing estimation variability and shows that the model may be dependent on the fish community.

Permanent Link: https://hdl.handle.net/11104/0351806

Šmejkal, Marek - **Bartoň, Daniel** - **Blabolil, Petr** - **Kolařik, Tomáš** - **Kubečka, Jan** - **Sajdlová, Zuzana** - **Souza, A.T.** - **Brabec, Marek**
Diverse environmental cues drive the size of reproductive aggregation in a rheophilic fish.

BackgroundAnimal migrations are periodic and relatively predictable events, and their precise timing is essential to the reproductive success. Despite large scientific effort in monitoring animal reproductive phenology, identification of complex environmental cues that determine the timing of reproductive migrations and temporal changes in the size of reproductive aggregations in relation to environmental variables is relatively rare in the current scientific literature.MethodsWe tagged and tracked 1702 individuals of asp (Leuciscus aspius), a large minnow species, and monitored with a resolution of one hour the size of their reproductive aggregations (counts of sexes present at the breeding grounds standardized by the sum of individuals in the season) over seven breeding seasons using passive integrated transponder tag systems. We examined the size of reproductive aggregations in relation to environmental cues of day number within a reproductive season (intra-year seasonality), water temperature, discharge, hour in a day (intra-day pattern), temperature difference between water and air, precipitation, atmospheric pressure, wind speed and lunar phase. A generalized additive model integrating evidence from seven breeding seasons and providing typical dynamics of reproductive aggregations was constructed.Results We demonstrated that all environmental cues considered contributed to the changes in the size of reproductive aggregations during breeding season, and that some effects varied during breeding season. Our model explained approximately 50% of the variability in the data and the effects were sex-dependent (models of the same structure were fitted to each sex separately, so that we effectively stratified on sex). The size of reproductive aggregations increased unimodally in response to day in season, correlated positively with water temperature and wind speed, was highest before and after the full moon, and highest at night (interacting with day in a season). Males responded negatively and females positively to increase in atmospheric pressure.Conclusion The data demonstrate complex utilization of available environmental cues to time reproductive aggregations in freshwater fish and their interactions during the reproductive season. The study highlights the need to acquire diverse data sets consisting of many environmental cues to achieve high accuracy of interpretation of reproductive timing.
Permanent Link: https://hdl.handle.net/11104/0351810

Tušer, Michal - **Brabec, Marek** - **Balk, H.** - **Draštík, Vladislav** - **Kubečka, Jan** - **Frouzová, Jaroslava**
Feasibility of time-dependent amplitude in pulse-compressed broadband acoustic signals for determining the dorsal orientation of fish.

Fish body orientation significantly influences the size obtained with hydroacoustic signals, and thus the estimate of fish size and biomass. For this reason, each characteristic of a target's echo can be advantageous for developing algorithms to refine acoustic fish estimates. We measured pulse-compressed broadband acoustic signals from tethered fish (common bream Abramis brama) in different dorsal positions. Based on generalized additive mixed models (GAMM), we initially tested the influence of the fish dorsal aspect on the amplitude echo envelope and amplitude echo descriptors (amplitude maximum and amplitude echo length at seven different levels below the maximum) by altering the fish dorsal orientation. Our study confirmed that the dorsal aspect influenced the shapes of the amplitude echo envelopes in both fast- and slow-tapered pulses. Furthermore, we found that echo lengths approximately 15 dB below the amplitude maximum, especially for fast-tapered signals, could provide good characteristics of the echo-envelope shape for determining the fish dorsal aspect and facilitating thus the conversion between acoustic target strength and true fish length.
Permanent Link: https://hdl.handle.net/11104/0351813

Vašek, Mojmír - Brabec, Marek - Blabolil, Petr - Čech, Martin - Draštík, Vladislav - Jůza, Tomáš - Kubečka, Jan - Muška, Milan - Peterka, Jiří - Prchalová, Marie - Říha, Milan - Hejzlar, Josef
Fish scale stable isotopes as potential indicators of nutrient pollution: Exploring the response of roachi (Rutilus/ii rutilus)/i scale d15N and d13C to a gradient of land use disturbance.

To examine the suitability of fish scales as potential tracers of nutrient pollution, we analysed the nitrogen and carbon sta-ble isotope values (d15N and d13C) in scales of a generalist fish species, roach Rutilus rutilus, collected from 22 Czech res-ervoirs covering wide gradients of catchment land use and nutrient enrichment. Using generalised additive mixed models in the first step and generalised linear mixed models in the second step, we evaluated the response of roach scale stable isotope values to catchment land use variables (percentage of agricultural land and human population density) and in-reservoir water quality variables. Roach scale d15N values varied by 15 %o among the reservoirs and were strongly, line-arly, and positively associated with the percentage of agricultural

land in the reservoir catchments, pointing to agriculture as the dominant source of nitrogen pollution in the investigated systems. Roach scale d13C values differed by d‰o among the studied reservoirs and were not related to catchment land use variables or in-reservoir primary production (chloro-phyll-a levels). Possible variation in roach foraging strategies (littoral versus pelagic) between reservoirs or the contrasting effects of eutrophication-related autotrophic and heterotrophic processes on baseline d13C values may explain the lack of relationships between roach scale d13C values and the explanatory variables. In summary, our findings show that fish scale d15N values are sensitive bioindicators of catchment-derived anthropogenic nitrogen inputs to freshwater ecosystems. Because scales can be sampled in a nonlethal way and d15N analysis is relatively inexpensive, we suggest that measuring the d15N values of fish scales could be an effective method for monitoring nitrogen pollution in aquatic environments.
Permanent Link: https://hdl.handle.net/11104/0351808

Invasive alien species cause significant loss of biodiversity. The presence of invasive alien species is often left unnoticed until they become highly abundant, and early detection by citizens can serve as an early indicator of invasion. Here, we aimed to investigate the detection probability of invasive gibel carp (Carassius gibelio) and native critically endangered species, crucian carp (Carassius carassius), using typical methods employed by conservation agencies (fyke nets) and citizens (angling). Three sites with native crucian carp, nine sites with species syntopy and five sites with invasive gibel carp were investigated. The proportion of species caught by each method was compared using catch per unit effort (CPUE) as a measure of fish density and calculated as the number of fish of each species caught per hour. Species detectability by trapping and angling and the effects of waterbody type on the species catch success were analysed using a Beta regression model. Although the species are closely related and occupy similar positions in the ecosystem, the results showed a high affinity of invasive gibel carp for detection by angling (citizen method), while native crucian carp showed higher catch success in trapping (common professional moni-toring method), to an extent that one species can be easily missed when sampled by only one of the methods. These results bring two important findings, namely the need to include citizen knowledge as an indicator of the progress of invasive gibel carp, and the potential danger of underestimating the invasion by conservationists and scientists. The results also suggest that the presence of native crucian carp in syntopy with invasive gibel carp may be overlooked by citizens. This study provides an example of detection bias that can hinder conservation efforts if neglected.
Permanent Link: https://hdl.handle.net/11104/0351642

0583415 - ÚI 2025 GB eng J - Journal Article
Van Der Giessen, I. - Jalali, Raheleh - Kuznets, R.
Uniform interpolation via nested sequents and hypersequents (ACCEPTED Dec 2023).
Journal of Logic and Computation. ISSN 0955-792X. E-ISSN 1465-363X
Permanent Link: https://hdl.handle.net/11104/0351384

Weighted programs were recently introduced by Batz et al. (Proc. ACM Program. Lang. 2022) as a
generalization of probabilistic programs which can also represent optimization problems and, in
general, programs whose execution traces carry some sort of weight. Batzet al. show that a weighted
version of Dijkstra's weakest precondition operator can be used to reason about the competitive ratios
of weighted programs. In this paper we study a propositional abstraction of weighted programs with
three main contributions. First, we formulate a semantics for weighted programs with the weighted
weakest precondition operator based on functions from multimonoids to quantales. Second, we show
that the weighted weakest precondition operator corresponds to a generalization of the domain
operator known from Kleene algebra with domain, and we study the properties of the generalized
domain operator. Third, we formulate a weighted version of Kleene algebra with domain as a
framework for reasoning about weighted programs with weakest precondition in an abstract setting.
Permanent Link: https://hdl.handle.net/11104/0352276

The primary aim of this work is to illustrate the importance of the choice of the appropriate methods for the statistical analysis of economic data. Typically, there exist several alternative versions of common statistical methods for every statistical modeling task and the most habitually used ("vanilla") versions may yield rather misleading results in nonstandard situations. Linear regression is considered here as the most fundamental econometric model. First, the analysis of a world tourism dataset is presented, where the number of international arrivals is modeled for 140 countries of the world as a response of 14 pillars (indicators) of the Travel and Tourism Competitiveness Index. Heteroscedasticity is clearly recognized in the dataset. However, the Aitken estimator, which would be the standard remedy in such a situation, is revealed here to be very inappropriate, regression quantiles represent a much more suitable solution here. The second illustration with artificial data reveals standard regression quantiles to be unsuitable for data contaminated by outlying values, their recently proposed robust version turns out to be much more appropriate. Both illustrations reveal that choosing suitable methods represent an important (and often difficult) part of the analysis of economic data.
Permanent Link: https://hdl.handle.net/11104/0351663

0583783 - ÚI 2024 RIV CH eng C - Conference Paper (international conference)
Haniková, Zuzana - Manya, F. - Vidal, A.
The MaxSAT Problem in the Real-Valued MV-Algebra.
Automated Reasoning with Analytic Tableaux and Related Methods. TABLEAUX 2023 Proceedings. Cham: Springer, 2023 - (Ramanayake, R.; Urban, J.), s. 386-404. Lecture Notes in Computer Science, 14278. ISBN 978-3-031-43512-6. ISSN 0302-9743.
[TABLEAUX 2023: International Conference on Automated Reasoning with Analytic Tableaux and Related Methods /32./. Prague (CZ), 18.09.2024-21.09.2024]
Grant - others:AV ČR(CZ) CSIC-20-12
Program: Bilaterální spolupráce
Institutional support: RVO:67985807
Keywords : Maximum satisfiability * Satisfiability * Łukasiewicz logic * MV-algebra
OECD category: Computer sciences, information science, bioinformathics (hardware development to be 2.2, social aspect to be 5.8)
https://link.springer.com/chapter/10.1007/978-3-031-43513-3_21
DOI: 10.1007/978-3-031-43513-3_21

This work addresses the maximum satisfiability (MaxSAT) problem for a multiset of arbitrary formulas of the language of propositional Łukasiewicz logic over the MV-algebra whose universe is the real interval [0,1]. First, we reduce the MaxSAT problem to the SAT problem over the same algebra. This solution method sets a benchmark for other approaches, allowing a classification of the MaxSAT problem in terms of metric reductions introduced by Krentel. We later define an alternative analytic method with preprocessing in terms of a Tseitin transformation of the input, followed by a reduction to a system of linear constraints, in analogy to the earlier approaches of Hähnle and Olivetti. We discuss various aspects of these approaches to solving the problem.
Permanent Link: https://hdl.handle.net/11104/0351788

0583814 - ÚI 2024 RIV CZ eng C - Conference Paper (international conference)
Hladký, Jan - Hng, Eng Keat
Fractionally Isomorphic Graphs and Graphons.
EUROCOMB'23. Proceedings of the 12th European Conference on Combinatorics, Graph Theory and Applications. Brno: MUNI Press, 2023 - (Kráľ, D.; Nešetřil, J.), s. 579-586. E-ISSN 2788-3116.
[EUROCOMB 2023: European Conference on Combinatorics, Graph Theory and Applications /12./. Prague (CZ), 28.08.2023-01.09.2023]

0583812 - ÚI 2024 RIV CZ eng C - Conference Paper (international conference)
Hladký, Jan - Řada, Hanka
Permutation Flip Processes.
EUROCOMB'23. Proceedings of the 12th European Conference on Combinatorics, Graph Theory and Applications. Brno: MUNI Press, 2023 - (Kráľ, D.; Nešetřil, J.), s. 587-594. E-ISSN 2788-3116.
[EUROCOMB 2023: European Conference on Combinatorics, Graph Theory and Applications /12./.
Prague (CZ), 28.08.2023-01.09.2023]

0583718 - ÚI 2025 RIV NL eng V - Research Report
Wiedermann, Jiří - van Leeuwen, J.
Artificial Intelligence as a Pathway to Our Future.
Utrecht: Utrecht University, 2024. 17 s. Technical Report, UU-PCS-2024-01.
Grant - others:AV ČR(CZ) StrategieAV21/1
Program: StrategieAV
Institutional support: RVO:67985807
Keywords : AI regulation * artificial wisdom * DIKW hierarchy * epistemic computation * generative AI * illusory intelligence * knowledge * large language models * 4E cognition
OECD category: Computer sciences, information science, bioinformathics (hardware development to be 2.2, social aspect to be 5.8)
https://webspace.science.uu.nl/~leeuw112/techreps/UU-PCS-2024-01.pdf
ZÁKLADNÍ ÚDAJE: Utrecht: Utrecht University, 2024. Technical Report, UU-PCS-2024-01. ABSTRAKT: Generative AI is the talk-of-the-town. Should it be welcomed or should it be feared? Is it a great extension of the human mind that should be cherished or should its development and use be limited? This essay aims to shed light on these tantalizing questions from a general, philosophical perspective. Why is AI being developed, and what is the purpose of using it? What does it mean for mankind, for our future? The answers can be traced in the development of the field to date and explain both the urge to develop it further and the urge to control it.
Permanent Link: https://hdl.handle.net/11104/0351716

0583712 - ÚI 2024 RIV NL eng V - Research Report
Wiedermann, Jiří - van Leeuwen, J.
From Knowledge to Wisdom: The Power of Large Language Models in AI.
Utrecht: Utrecht University, 2023. 14 s. Technical Report, UU-PCS-2023-01.
Grant - others:AV ČR(CZ) StrategieAV21/26
Program: StrategieAV
Institutional support: RVO:67985807
Keywords : artificial wisdom * DIKW hierarchy * epistemic computation * generative AI * illusory intelligence * knowledge * large language models * 4E cognition

OECD category: Computer sciences, information science, bioinformathics (hardware development to be 2.2, social aspect to be 5.8)

https://webspace.science.uu.nl/~leeuw112/techreps/UU-PCS-2023-01.pdf

ZÁKLADNÍ ÚDAJE: Utrecht: Utrecht University, 2023. Technical Report, UU-PCS-2023-01. ABSTRAKT: In this paper, we explore the purpose and potential of artificial intelligence (AI) in light of the current generation of large language models. We argue that these models can be seen as tools for acquiring and generating artificial wisdom, enabling us to make wiser decisions and behave more intelligently. Unlike earlier AI approaches, which focused on generating knowledge from data, contemporary language models have the ability to extract meaning from syntactic patterns and relate this meaning to real-world descriptions. This capacity reflects a form of cognition known as 4E cognition, which emphasizes the embodied, embedded, extended, and enacted nature of intelligent behavior. We argue that contemporary language models possess a form of illusory intelligence and illusory wisdom that has not been described in the literature before. This insight challenges the traditional computational approaches to AI and opens up new avenues for research on the relationship between language, cognition, and intelligence. By recognizing the potential of large language models to generate and use wisdom, we can move beyond knowledge-centric approaches to AI and develop more nuanced models of intelligent behavior.

Permanent Link: https://hdl.handle.net/11104/0351705

0582609 - ÚI 2024 eng A - Abstract

Cerna, David M.

Anti-unification: Introduction, Applications, and Recent Results.

[VERAO 2024: Summer Workshop in Mathematics /16./. Brasilia, 05.02.2024-09.02.2024]

Method of presentation: Zvaná přednáška

Event organizer: Department of Mathematics, Instituto de Ciências Exatas, Universidade de Brasília

URL events: https://mat.unb.br/verao2024/verao.html

Institutional support: RVO:67985807

https://mat.unb.br/verao2024/verao.html#plenary

Anti-unification is a method for symbolically generalizing formal expression. It was introduced independently by Plotkin and Reynolds as an operation for inductive inferencing. Though conceptually simple, it is an effective tool for abstraction and templating. Since the seminal work, the number of applications has grown tremendously with uses in program analysis, program repair, library compression, automated reasoning, and beyond. With the growth of applications, there has been an effort to strengthen the theoretical foundations of the subject. In this talk, we introduce anti-unification, overview the existing applications, and discuss recent theoretical results concerning equational and high-order anti-unification.

Permanent Link: https://hdl.handle.net/11104/0350690

0584019 - ÚI 2024 NL eng A - Abstract

Sedlár, Igor - Bílková, Marta

Epistemic Logics of Structured Intensional Groups.

14th Tbilisi Symposium on Logic, Language and Computation (TbiLLC 2023): Accepted Contributions. Amsterdam: Tbilisi State University & Georgian Academy of Sciences & University of Amsterdam, 2023.

[TbiLLC 2023: Tbilisi Symposium on Logic, Language and Computation /14./. 18.09.2023-22.09.2023, Telavi]

Institutional support: RVO:67985807

https://events.illc.uva.nl/Tbilisi/Tbilisi2023/uploaded_files/inlineitem/Bilkova_Sedlar.pdf

Permanent Link: https://hdl.handle.net/11104/0352008

0584634 - ÚI 2024 eng A - Abstract
Paluš, Milan - Arinyo i Prats, A. - López-Madrona, V. J.
Cross-frequency coupling in the brain dynamics: Causality vs. lead-lag relationship.
[NDES 2024. Nonlinear Dynamics of Electronic Systems conference /28./. Grächen, 16.09.2024-18.09.2024]
Method of presentation: Zvaná přednáška
URL events: https://sites.google.com/view/ndes2024/home
https://sites.google.com/view/ndes2024/home/scientific-program
Permanent Link: https://hdl.handle.net/11104/0352521

0584188 - ÚI 2024 eng A - Abstract
Duintjer Tebbens, Jurjen - Meurant, G.
The roots of GMRES polynomials need not influence GMRES residual norms.
[NL2A 2016. Numerical Linear Algebra and Applications. Luminy, 24.10.2016-28.10.2016]
Method of presentation: Přednáška
URL events: https://conferences.cirm-math.fr/1500.html
https://conferences.cirm-math.fr/1500.html
Permanent Link: https://hdl.handle.net/11104/0352170

0584630 - ÚI 2024 cze A - Abstract
Valenta, Zdeněk
Úvod do analýzy přežití.
[Broumovský internistický den /19./. Broumov, 15.05.2024-15.05.2024]
Method of presentation: Zvaná přednáška
Event organizer: EDUMED s.r.o.
https://www.edu-med.cz/index.php/component/content/article/2024-02-12-13-20-23?catid=12&Itemid=101
Permanent Link: https://hdl.handle.net/11104/0352519

0582408 - ÚI 2024 DE eng A - Abstract
Friedová, N. - Šípek jr., A. - Liška, F. - Gregor, V. - Šípek, A. - Klaschka, Jan - Malý, Marek
Incidence of the congenital microcephaly in the Czech Republic.
European Journal of Human Genetics. Springer. Roč. 31, Suppl. 1 (2023), s. 311-311, č. článku EP20.014. ISSN 1018-4813. E-ISSN 1476-5438.
[ESHG 2022: European-Society-of-Human-Genetics Conference /55./. 11.06.2022-14.06.2022, Vienna]
R&D Projects: GA MZd NV17-29622A
Permanent Link: https://hdl.handle.net/11104/0350480

0582912 - ÚI 2024 eng A - Abstract
Kalina, Jan
Clinical Decision Support Sytems: Towards information-based Medicine.
[Building Bridges 2023. Dresden, 16.05.2023-17.05.2023]
Method of presentation: Zvaná přednáška
Event organizer: Helmholtz-Zentrum Dresden-Rossendorf
URL events: https://building-bridges-conference.eu/archive/
Institutional support: RVO:67985807
Keywords : popularizace vědy
Permanent Link: https://hdl.handle.net/11104/0350953

0584021 - ÚI 2024 eng A - Abstract
Jajcay, Nikola
Modeling Connectivity: DCM for EEG.
[Computational Psychiatry Course 2023. Zürich / Online, 09.09.2023-14.09.2023]
Method of presentation: Zvaná přednáška
Event organizer: Translational Neuromodeling Unit (TNU), University of Zurich & ETH Zurich
Institutional support: RVO:67985807
https://www.translationalneuromodeling.org/cpcourse/
Permanent Link: https://hdl.handle.net/11104/0352009

0584018 - ÚI 2024 NL eng A - Abstract
Sedlár, Igor - Majer, Ondrej
Weighted Programs and Ethical Planning.
*14th Tbilisi Symposium on Logic, Language and Computation (TbiLLC 2023): Accepted
Contributions.* Amsterdam: Tbilisi State University & Georgian Academy of Sciences & University of
Amsterdam, 2023.
[TbiLLC 2023: Tbilisi Symposium on Logic, Language and Computation /14./. 18.09.2023-22.09.2023,
Telavi]
Institutional support: RVO:67985807
https://events.illc.uva.nl/Tbilisi/Tbilisi2023/uploaded_files/inlineitem/Majer_Sedlar.pdf
Permanent Link: https://hdl.handle.net/11104/0352007

0583831 - ÚI 2024 RIV cze U - Conference, Workshop Arrangement
Martinková, Patrícia - Potužníková, E. - Netík, Jan
Participativní workshopy.
[Participatory workshops).]
[Praha, 23.10.2023-23.10.2023, (W-EUR 30/1)]
R&D Projects: GA TA ČR(CZ) TL05000008
Institutional support: RVO:67985807
Keywords : workshop * psychometrické modely * znalostní testy * interaktivní aplikace *
psychometric models * educational tests * interactive applications
OECD category: Education, general; including training, pedagogy, didactics [and education systems]
https://www.cs.cas.cz/comps/workshop/

Participativní workshopy na podporu implementace 'Souboru postupů a nástrojů pro zkvalitnění tvorby
znalostních testů pomocí psychometrických modelů' do procesů vývoje a validace znalostních testů
aplikačního garanta a dalších tvůrců testů, a na podporu využití výsledků z testování řediteli škol.
Celkem proběhly tři participativní workshopy, které účastníky seznámily s fungováním interaktivních
modulů, interpretací zpráv, a psychometrickými metodami pro analýzu výsledků testů včetně detekce
problematických testových položek a identifikace meziskupinových rozdílů.

Participatory workshops to support the implementation of the 'Collection of procedures and tools for
improving the develpoment of educational tests using psychometric models' into the knowledge test
development and validation processes of the application guarantor and other test developers, and to
support the use of test results by school principals. A total of three participatory workshops were held
to familiarize participants with the functioning of the interactive modules, report interpretation, and
psychometric methods for analyzing test results, including detection of problematic test items and
identification of intergroup differences.
Permanent Link: https://hdl.handle.net/11104/0351829

0583939 - ÚI 2024 RIV CZ cze A - Abstract
Martinková, Patrícia
Data science pro analýzu přijímacích a maturitních testů.
Den otevřených dveří Ústavu informatiky AV ČR 2023 - program. Praha: Ústav informatiky AV ČR, 2023.
[Týden Akademie věd ČR. 06.11.2023-12.11.2023, Praha]
R&D Projects: GA TA ČR(CZ) TL05000008
Institutional support: RVO:67985807
https://www.cs.cas.cz/news/2023-11-08-Den-otevrenych-dveri/en
ZÁKLADNÍ ÚDAJE: Den otevřených dveří Ústavu informatiky AV ČR 2023 - program. Praha: Ústav informatiky AV ČR, 2023. [Týden Akademie věd ČR. 06.11.2023-12.11.2023, Praha] ABSTRAKT: Přijímací a maturitní zkoušky rozhodují o budoucnosti mnoha mladých lidí. Avšak, jak zajistit, aby takové testy opravdu měřily to, co mají, a byly spolehlivé? Co když bychom mohli využít technologie, která nám pomůže předpovědět obtížnost jednotlivých otázek a vytvořit adaptivní testy na míru každému studentovi? V této prezentaci se podíváme na komplexní analýzu testů a položek a ukážeme si, jak lze pomocí strojového učení předpovídat obtížnost položek a zefektivnit testování pomocí počítačových adaptivních testů.
Permanent Link: https://hdl.handle.net/11104/0351919

0584287 - ÚI 2024 eng A - Abstract
Martinková, Patrícia
Computational aspects of psychometric methods and beyond.
[IMPS 2024 Annual Meeting. Prague, 16.07.2024-19.07.2024]
Method of presentation: Zvaná přednáška
URL events: https://www.psychometricsociety.org/imps-2024
Institutional support: RVO:67985807
https://www.psychometricsociety.org/imps2024-speakers
Permanent Link: https://hdl.handle.net/11104/0352219

0583840 - ÚI 2024 cze U - Conference, Workshop Arrangement
Martinková, Patrícia
Projekt EduTest: Diskusní workshop s řediteli škol.
[Praha, 09.12.2021-09.12.2021, (W-CST)]
R&D Projects: GA TA ČR(CZ) TL05000008
Institutional support: RVO:67985807

9. 12. 2021 se uskutečnil diskusní workshop se skupinou ředitelů škol, jehož cílem bylo získat informace o současné praxi využívání výsledků z testování ve školách. Z důvodu pandemie Covid 19 proběhlo setkání online. Projektový tým získal od účastníků podněty pro přípravu participativního workshopu pro ředitele škol a pro další rozvoj vytvářeného interaktivního nástroje.
Permanent Link: https://hdl.handle.net/11104/0351839

0583827 - ÚI 2024 RIV CZ cze O - Others
Martinková, Patrícia - Potužníková, E. - **Netík, Jan** … Total 7 authors
Soubor postupů a nástrojů pro zkvalitnění tvorby znalostních testů pomocí psychometrických modelů.
[Collection of procedures and tools for improving the develpoment of educational tests using psychometric models.]
2023

ZÁKLADNÍ ÚDAJE: Martinková, Patrícia - Potužníková, E. - Netík, Jan. Soubor postupů a nástrojů pro zkvalitnění tvorby znalostních testů pomocí psychometrických modelů. 2023. ABSTRAKT: Soubor postupů a nástrojů obsahuje popis psychometrických metod včetně popisu vhodnosti jejich využití na příslušné typy testů, návody na jejich implementaci v interaktivním rozhraní, moduly interaktivních nástrojů, zdrojové kódy a funkce, vzorové postupy komplexní psychometrické analýzy včetně detekce rozdílů mezi skupinami na úrovni subškál a testových položek a jejich interpretace. Zahrnuje také vzorové zprávy pro tvůrce testů a pro školy.

MAIN INFORMATION: Martinková, Patrícia - Potužníková, E. - Netík, Jan. Collection of procedures and tools for improving the develpoment of educational tests using psychometric models. 2023.
ABSTRACT: The collection of procedures and tools contains a description of the psychometric methods including a description of their suitability for the relevant test types, instructions for their implementation in the interactive application, modules of the interactive tools, source codes and functions, sample procedures for complex psychometric analysis including the detection of differences between groups at the subscale and test item level and their interpretation. It also includes sample reports for test developers and schools.
Permanent Link: https://hdl.handle.net/11104/0351830