

## Záznamy vložené do ASEP za UI (1. 10. – 30. 11. 2024)

### New ICS records in ASEP (1. 10. – 30. 11. 2024)

0599998 - ÚI 2025 RIV CZ cze B - Monography

**Mařík, V. - Trčka, M. - Černý, David**

*Proč se nebát umělé inteligence? AI pohledem nejen českých odborníků.*

Brno: Jota, 2024. 442 s. ISBN 978-80-7689-459-4

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

Autoři knihy *Proč se nebát umělé inteligence?* nabízejí střízlivý a odborně podložený pohled na současný stav a perspektivy umělé inteligence (AI). Čtenář se ve srozumitelné podobě dozví, na jakých technologických základech AI stojí, jaká je její historie a jak probíhá zpracování přirozené řeči ve velkých jazykových modelech. Kniha rovněž ukazuje, jak aplikace AI už dnes slouží v průmyslu, zdravotnictví, robotice či v oblasti kybernetické bezpečnosti a jak konkrétně je možné AI využít například ve státní správě či ve službách. Řada příspěvků je věnována filozofickým úvahám o roli a možnostech umělých strojů, etice a právu při jejich využívání. *Proč se nebát umělé inteligence?* je soubor esejí, které připravili nejen čeští odborníci v jednotlivých oblastech AI. Vyvracejí mýty, přehnaná očekávání a uměle vyvolané obavy, a naopak zdůrazňují její užitečnost a využitelnost. Možná vás překvapí, že český přínos k rozvoji této zajímavé vědní disciplíny vůbec není zanedbatelný. Kniha je určena všem, kteří se v důsledku neadekvátní „popularizace“ obávají prudkého nástupu umělé inteligence. Na své si přijdou i ti, kteří se v té či oné míře s umělou inteligencí dennodenně setkávají, včetně IT odborníků, studentů všech typů škol i pracovníků v průmyslu, službách či státní správě. Eseje na sebe přímo nenavazují, jsou nezávislé a lze je číst v jakémkoliv pořadí či kterékoliv vynechat. Každý si může najít to, co ho nejvíce zajímá.

**Permanent Link:** <https://hdl.handle.net/11104/0357371>

0599996 - ÚI 2025 RIV CZ cze M - Monography Chapter

**Mařík, V. - Pelikán, Emil**

Historie výzkumu AI v České republice: od minulosti až k dnešku.

*Proč se nebát umělé inteligence: AI pohledem nejen českých odborníků.* Vydání první. Brno: Jota, 2024 - (Mařík, V.; Trčka, M.; Černý, D.), s. 61-67. ISBN 978-80-7689-459-4

**Institutional support:** RVO:67985807

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

Výzkum umělé inteligence má v České republice dlouholetou tradici. Již v 60. letech spolupracoval prof. Zdeněk Kotek z ČVUT se Stanfordskou univerzitou a v roce 1967 byl pod jeho vedením sestaven elektronický model neuronu a model jednoduché neuronové sítě. Koncem 40. let a na počátku 70. let minulého století se na katedře řídicí techniky ČVUT v Praze, ale např. i na Vysoké škole strojní a elektrotechnické v Plzni (VŠSE) běžně modelovaly neuronové sítě pro potřeby rozpoznávání objektů v robotice, pro zpracování hlasových povelů a prvotní zpracování vizuální informace. Byly zformulovány procesy adaptace a učení a začal vývoj metod strojového učení, v první fázi zejména pro potřeby automatického řízení a robotiky.

**Permanent Link:** <https://hdl.handle.net/11104/0357370>

0601380 - ÚI 2025 RIV CZ cze M - Monography Chapter

**Černý, David**

Etika AI: co je etika a k čemu vlastně je?

*Proč se nebát umělé inteligence: AI pohledem nejen českých odborníků.* Vydání první. Brno: Jota, 2024 - (Mařík, V.; Trčka, M.; Černý, D.), s. 351-364. ISBN 978-80-7689-459-4

**Institutional support:** RVO:67985807

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

**Permanent Link:** <https://hdl.handle.net/11104/0358533>

0601384 - ÚI 2025 RIV CZ cze M - Monography Chapter

**Černý, David**

Terra incognita mezi současnou AI a nepřátelskou umělou superinteligencí.

*Proč se nebát umělé inteligence: AI pohledem nejen českých odborníků.* Vydání první. Brno: Jota, 2024 - (Mařík, V.; Trčka, M.; Černý, D.), s. 331-350. ISBN 978-80-7689-459-4

**Institutional support:** RVO:67985807

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

**Permanent Link:** <https://hdl.handle.net/11104/0358535>

0599552 - ÚI 2025 CZ cze M - Monography Chapter

**Wiedermann, Jiří - van Leeuwen, J.**

Umělá inteligence jako zdviž do naší budoucnosti.

*Proč se nebát umělé inteligence: AI pohledem nejen českých odborníků.* Vydání první. Brno: Jota, 2024 - (Mařík, V.; Trčka, M.; Černý, D.), s. 397-413. ISBN 978-80-7689-459-4

**R&D Projects:** GA TA ČR(CZ) CK04000150

**Institutional support:** RVO:67985807

**Permanent Link:** <https://hdl.handle.net/11104/0356976>

0601544 - ÚI 2025 RIV DE eng J - Journal Article

**Dimai, M. - Brabec, Marek**

A Bayesian model for age at death with cohort effects.

*Demographic Research.* Roč. 51, October 2024 (2024), s. 1017-1058, č. článku 33. ISSN 1435-9871. E-ISSN 1435-9871

**Institutional support:** RVO:67985807

**OECD category:** Statistics and probability

**Impact factor:** 2.1, year: 2023

**Method of publishing:** Open access

**DOI:** <https://doi.org/10.4054/DemRes.2024.51.33>

BACKGROUND: Ongoing mortality trends affect the distribution of age at death, typically described byparametric models. Cohort effects can markedly perturb the distribution and reduce thefit of such models, and this needs to be specifically taken into account. OBJECTIVE: This study examines the integration of cohort effects in a three-component parametricmodel for the age-at-death distribution, applying it to data with significant cohort effects. METHODS: We employed a mixture model with a half-normal and two skew-normal components,adapted to a Bayesian framework to include multiplicative cohort effects. The model wasapplied to data from five Italian regions, with cohort effects estimated for the 1915-1925cohorts. RESULTS: Incorporating cohort effects significantly improved the model's fit. A notable finding ofthe comprehensive model is the shift in Italy from

premature to middle-age mortality components over time. Our results also demonstrate the tendency for mortality structures to spatially homogenize over time in Italy. CONCLUSIONS: The study underscores the importance of including cohort effects in mortality models in order to provide a more detailed picture of mortality trends. CONTRIBUTION: This work introduces a novel application of a Bayesian mixture model with cohort effects, offering enhanced tools for demographic analysis and new insights into the evolution of mortality components in Italy. This approach is general but fully formalized and hence it can be readily used for demographic studies in other regions as well.

**Permanent Link:** <https://hdl.handle.net/11104/0358715>

0599536 - ÚI 2025 CZ cze J - Journal Article

**Brožová, K. - Michalec, J. - [Brabec, Marek](#) - Borilová Linhartová, P. - Povolná, E. - Kohout, P. - Brož, J.**

Dynamics of glucose concentration changes during ketogenic diet initiation in pediatric patients with drug-resistant epilepsy - analysis of glucose values in individual patients.

*Česká a Slovenská neurologie a neurochirurgie*. Č. 3 (2024), s. 197-207. ISSN 1210-7859. E-ISSN 1802-4041

**Institutional support:** RVO:67985807

**Keywords :** ketogenic diet \* drug-resistant epilepsy \* glucose concentration \* pediatric patients

**Impact factor:** 0.3, year: 2023

**Method of publishing:** Limited access

**Result website:**

<https://doi.org/10.48095/cccsnn2024197>

**DOI:** <https://doi.org/10.48095/cccsnn2024197>

**Aim:** The aim was to analyze individual changes in glucose concentration before starting the ketogenic diet (KD) and during the first 5 days of its use in individual non-diabetic children with drug-resistant epilepsy. **Subjects and methodology:** Ten pediatric patients with pharmaco-resistant epilepsy started on KD according to a non-fasting KD protocol with a ketogenic ratio (KR) that gradually increased day by day from 1 : 1, 2 : 1, 3 : 1 to 3.5 : 1. Continuous glucose monitoring (CGM) was performed 36 h before initiation and then over 5 days during increasing KR. **Results:** Mean glycemic control estimates for each dietary ratio ranged from 6.03 (95% confidence interval [CI] 5.92–6.14) mmol/l on a normal diet to 2.56 (CI 95%: 2.46–2.66) mmol/l on 3.5 : 1 KR within all measured values and from 4.91 (CI 95%: 4.75–5.06) mmol/l on a normal diet to 1.85 (CI 95%: 1.53–2.17) mmol/l on 3.5 : 1 KR within fasting values measured between 5:00 a.m. and 6:00 a.m. CGM showed hypoglycemic events during KD initiation in 9 patients. **Conclusion:** Analysis of individual patient data showed a trend of gradually decreasing glycemia with increasing KR. This trend seems to be stronger for all data obtained compared to those during fasting (period 5.00–6.00 am). In most patients, episodes of asymptomatic hypoglycemia were captured during diet initiation.

**Permanent Link:** <https://hdl.handle.net/11104/0356974>

0599999 - ÚI 2025 RIV DE eng J - Journal Article

**[Resler, Jaroslav](#) - Bauerová, P. - Belda, M. - [Bureš, Martin](#) - [Eben, Kryštof](#) - Fuka, V. - [Geletič, Jan](#) - Jareš, R. - Karel, J. - Keder, J. - [Krč, Pavel](#) - Patiño, W. - [Radović, J.](#) - [Řezníček, Hyněk](#) - Sühling, M. - [Šindelářová, A.](#) - [Vlček, O.](#)**

Challenges of high-fidelity air quality modeling in urban environments – PALM sensitivity study during stable conditions.

*Geoscientific Model Development*. Roč. 17, č. 20 (2024), s. 7513-7537. ISSN 1991-959X. E-ISSN 1991-9603

**R&D Projects:** GA TA ČR(CZ) TO01000219; GA MŠMT(CZ) EH22\_008/0004605

**Research Infrastructure:** e-INFRA CZ II - 90254

**Institutional support:** RVO:67985807

**Keywords :** large-eddy simulation \* PALM \* urban climate \* air quality \* ventilation \* sensitivity

**OECD category:** Meteorology and atmospheric sciences

**Impact factor:** 4, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.5194/gmd-17-7513-2024>

**DOI:** <https://doi.org/10.5194/gmd-17-7513-2024>

Urban air quality is an important part of human well-being, and its detailed and precise modeling is important for efficient urban planning. In this study the potential sources of errors in large eddy simulation (LES) runs of the PALM model in stable conditions for a high-traffic residential area in Prague, Czech Republic, with a focus on street canyon ventilation, are investigated. The evaluation of the PALM model simulations against observations obtained during a dedicated campaign revealed unrealistically high concentrations of modeled air pollutants for a short period during a winter inversion episode. To identify potential reasons, the sensitivities of the model to changes in meteorological boundary conditions and adjustments of model parameters were tested. The model adaptations included adding the anthropogenic heat from cars, setting a bottom limit of the subgrid-scale turbulent kinetic energy (TKE), adjusting the profiles of parameters of the synthetic turbulence generator in PALM, and limiting the model time step. The study confirmed the crucial role of the correct meteorological boundary conditions for realistic air quality modeling during stable conditions. Besides this, the studied adjustments of the model parameters proved to have a significant impact in these stable conditions, resulting in a decrease in concentration overestimation in the range 30 %–66 % while exhibiting a negligible influence on model results during the rest of the episode. This suggested that the inclusion or improvement of these processes in PALM is desirable despite their negligible impact in most other conditions. Moreover, the time step limitation test revealed numerical inaccuracies caused by discretization errors which occurred during such extremely stable conditions.

**Permanent Link:** <https://hdl.handle.net/11104/0357373>

0600108 - ÚI 2025 RIV NL eng J - Journal Article

**Morozova, A. - Španiel, F. - Škoch, A. - [Brabec, Marek](#) - Zolotarov, G. - Musil, V. - Zach, P.**

Enlarged brain perivascular spaces correlate with blood plasma osmolality in the healthy population: A longitudinal study.

*Neuroimage*. Roč. 300, October 2024 (2024), č. článku 120871. ISSN 1053-8119. E-ISSN 1095-9572

**R&D Projects:** GA MZd(CZ) NU21-08-00432

**Institutional support:** RVO:67985807

**Keywords :** Blood plasma osmolality \* Glymphatic system \* Interhemispheric asymmetry \*

Perivascular spaces \* Total intracranial volume

**OECD category:** Statistics and probability

**Impact factor:** 4.7, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.1016/j.neuroimage.2024.120871>

**DOI:** <https://doi.org/10.1016/j.neuroimage.2024.120871>

Enlarged perivascular spaces (EPVS) are increasingly recognized as an MRI detectable feature of neuroinflammatory processes and age-related neurodegenerative changes. Understanding perivascular characteristics in healthy individuals is crucial for their applicability as a reference for pathological changes. Limited data exists on the EPVS load and interhemispheric asymmetry in distribution among young healthy subjects. Despite the known impact of hydration on brain

morphometric studies, blood plasma osmolality's effect on EPVS remains unexplored. This study investigated the influence of age, total intracranial volume (TIV), and blood plasma osmolality on EPVS characteristics in 59 healthy adults, each undergoing MRI and osmolality assessment twice within 14.8 months (mean +/- 4 months). EPVS analysis was conducted in the centrum semiovale using high-resolution automated segmentation, followed by an optimization algorithm to enhance EPVS segmentation accuracy. Linear Mixed Effects model was used for the statistical analysis, which unveiled significant inter-individual variability in EPVS load and inter-hemispheric asymmetry. EPVS volume increased with age, higher TIV and lower blood plasma osmolality levels. Our findings offer valuable insights into EPVS characteristics among the healthy population, establishing a foundation to further explore age-related and pathological changes.

**Permanent Link:** <https://hdl.handle.net/11104/0357466>

0599365 - ÚI 2025 RIV CH eng J - Journal Article

**Řasová, K. - [Martinková, Patrícia](#) - [Vařejková, Michaela](#) - Miznerová, B. - Hlinovská, J. - Hlinovský, D. - Iskendri, D. - Lebdušková, L. - Vojíková, R. - Zakouřilová, J. - Běhounek, J. - Phillip, T.**

Improvements in Upper Extremity Isometric Muscle Strength, Dexterity, and Self-Care Independence During the Sub-Acute Phase of Stroke Recovery: An Observational Study on the Effects of Intensive Comprehensive Rehabilitation.

*Frontiers in Neurology*. Roč. 15, October 2024 (2024), č. článku 1442120. ISSN 1664-2295. E-ISSN 1664-2295

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Impact factor:** 2.7, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.3389/fneur.2024.1442120>

**DOI:** <https://doi.org/10.3389/fneur.2024.1442120>

**BACKGROUND:** Stroke often impairs upper extremity motor function, with recovery in the sub-acute phase being crucial for regaining independence. This study examines changes in isometric muscle strength, dexterity, and self-care independence during this period, and evaluates the effects of a comprehensive intensive rehabilitation (COMIRESTROKE). **METHODS:** Individuals in sub-acute stroke recovery and age- and sex-matched controls were assessed for pre- and post-rehabilitation differences in primary outcomes (grip/pinch strength, Nine Hole Peg Test [NHPT], Action Research Arm Test [ARAT]). COMIRESTROKE's effects on primary and secondary outcomes (National Institute of Health Stroke Scale [NIHSS], Modified Rankin Scale [MRS], Functional Independence Measure [FIM]) were evaluated. Outcomes were analyzed for dominant and non-dominant limbs, both regardless of impairment and with a focus on impaired limbs. **RESULTS:** Fifty-two individuals with stroke (NIHSS  $7.51 \pm 5.71$ , age  $70.25 \pm 12.66$  years,  $21.36 \pm 12.06$  days post-stroke) and forty-six controls participated. At baseline, individuals with stroke showed significantly lower strength (dominant grip, key pinch, tip-tip pinch,  $p < 0.05$ ), higher NHPT scores ( $p < 0.05$ ), and lower ARAT scores ( $p < 0.001$ ). COMIRESTROKE led to improvements in dominant key pinch, non-dominant tip-tip pinch, NHPT, and both dominant and non-dominant ARAT ( $p < 0.05$ ). Notably, non-dominant key pinch improved significantly when considering only impaired hands. Pre- and post-test differences between groups were significant only for ARAT (both limbs), even after adjustment ( $p < 0.05$ ). All secondary outcomes (NIHSS, MRS, FIM) showed significant improvement post-COMIRESTROKE ( $p < 0.001$ ). **CONCLUSION:** Individuals with stroke exhibit reduced muscle strength and dexterity, impairing independence. However, comprehensive intensive rehabilitation significantly improves these functions. Data are available from the corresponding author upon request and are part of a sub-study of NCT05323916.

**Permanent Link:** <https://hdl.handle.net/11104/0356848>

0600766 - ÚI 2025 RIV GB eng J - Journal Article

**Dudášová, J. - [Valenta, Zdeněk](#) - Sachs, J. R.**

Improving precision of vaccine efficacy evaluation using immune correlate data in time-to-event models.

*npj Vaccines*. Roč. 9, November 2024 (2024), č. článku 214. ISSN 2059-0105. E-ISSN 2059-0105

**Institutional support:** RVO:67985807

**Keywords :** Vaccine efficacy \* Immunogenicity \* Time-to-event data \* Precision \* Survival analysis

**OECD category:** Infectious Diseases

**Impact factor:** 6.9, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.1038/s41541-024-00937-6>

**DOI:** <https://doi.org/10.1038/s41541-024-00937-6>

Understanding potential differences in vaccine-induced protection between demographic subgroups is key for vaccine development. Vaccine efficacy evaluation across these subgroups in phase 2b or 3 clinical trials presents challenges due to lack of precision: such trials are typically designed to demonstrate overall efficacy rather than to differentiate its value between subgroups. This study proposes a method for estimating vaccine efficacy using immunogenicity (instead of vaccination status) as a predictor in time-to-event models. The method is applied to two datasets from immunogenicity sub-studies of vaccine phase 3 clinical trials for zoster and dengue vaccines. Results show that using immunogenicity-based estimation of efficacy in subgroups using time-to-event models is more precise than the standard estimation. Incorporating immune correlate data in time-to-event models improves precision in estimating efficacy (i.e., yields narrower confidence intervals), which can assist vaccine developers and public health authorities in making informed decisions.

**Permanent Link:** <https://hdl.handle.net/11104/0358062>

0601222 - ÚI 2025 DE eng J - Journal Article

**Maier, M. - [Bartoš, František](#) - Quintana, D. S. - Dablander, F. - van den Bergh, D. - Marsman, M. - Ly, A. - Wagenmakers, E. J.**

Model-averaged Bayesian t tests.

*Psychonomic Bulletin & Review*. Online 07 November 2024 (2024). ISSN 1069-9384. E-ISSN 1531-5320

**Research Infrastructure:** e-INFRA CZ - 90140

**Institutional support:** RVO:67985807

**Keywords :** Bayesian model-averaging \* t test \* Bayes factor \* t-likelihood \* Robust inference \* Unequal variances

**Impact factor:** 3.2, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.3758/s13423-024-02590-5>

**DOI:** <https://doi.org/10.3758/s13423-024-02590-5>

One of the most common statistical analyses in experimental psychology concerns the comparison of two means using the frequentist t test. However, frequentist t tests do not quantify evidence and require various assumption tests. Recently, popularized Bayesian t tests do quantify evidence, but these were developed for scenarios where the two populations are assumed to have the same variance. As an alternative to both methods, we outline a comprehensive t test framework based on Bayesian model averaging. This new t test framework simultaneously takes into account models that assume equal and unequal variances, and models that use t-likelihoods to improve robustness to

outliers. The resulting inference is based on a weighted average across the entire model ensemble, with higher weights assigned to models that predicted the observed data well. This new t test framework provides an integrated approach to assumption checks and inference by applying a series of pertinent models to the data simultaneously rather than sequentially. The integrated Bayesian model-averaged t tests achieve robustness without having to commit to a single model following a series of assumption checks. To facilitate practical applications, we provide user-friendly implementations in JASP and via the RoBTT package in R. A tutorial video is available at <https://www.youtube.com/watch?v=EcuzGTIcorQ>

**Permanent Link:** <https://hdl.handle.net/11104/0358427>

0599642 - ÚI 2025 RIV US eng J - Journal Article

**Tani Raffaelli, Giulio - Lalli, M. - Tria, F.**

Inference through innovation processes tested in the authorship attribution task.

*COMMUNICATIONS PHYSICS*. Roč. 7, č. 1 (2024), č. článku 300. ISSN 2399-3650. E-ISSN 2399-3650

**R&D Projects:** GA ČR(CZ) GA21-17211S

**Institutional support:** RVO:67985807

**Keywords :** Applied mathematics \* Computational science \* Information theory and computation

**OECD category:** Statistics and probability

**Impact factor:** 5.4, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.1038/s42005-024-01714-6>

**DOI:** <https://doi.org/10.1038/s42005-024-01714-6>

Urn models for innovation capture fundamental empirical laws shared by several real-world processes. The so-called urn model with triggering includes, as particular cases, the urn representation of the two-parameter Poisson-Dirichlet process and the Dirichlet process, seminal in Bayesian non-parametric inference. In this work, we leverage this connection to introduce a general approach for quantifying closeness between symbolic sequences and test it within the framework of the authorship attribution problem. The method demonstrates high accuracy when compared to other related methods in different scenarios, featuring a substantial gain in computational efficiency and theoretical transparency. Beyond the practical convenience, this work demonstrates how the recently established connection between urn models and non-parametric Bayesian inference can pave the way for designing more efficient inference methods. In particular, the hybrid approach that we propose allows us to relax the exchangeability hypothesis, which can be particularly relevant for systems exhibiting complex correlation patterns and non-stationary dynamics.

**Permanent Link:** <https://hdl.handle.net/11104/0357093>

0600279 - ÚI 2025 RIV US eng J - Journal Article

**Jiang, Y. C. - Luo, C. - Wang, J. J. - Tomeček, David** ... Total 105 authors

Neurostructural subgroup in 4291 individuals with schizophrenia identified using the subtype and stage inference algorithm.

*Nature Communications*. Roč. 15, July 2024 (2024), č. článku 5996. ISSN 2041-1723. E-ISSN 2041-1723

**Institutional support:** RVO:67985807

**OECD category:** Neurosciences (including psychophysiology)

**Impact factor:** 14.7, year: 2023

**Method of publishing:** Open access

**Result website:** <https://doi.org/10.1038/s41467-024-50267-3>

**DOI:** <https://doi.org/10.1038/s41467-024-50267-3>

Machine learning can be used to define subtypes of psychiatric conditions based on shared biological foundations of mental disorders. Here we analyzed cross-sectional brain images from 4,222 individuals with schizophrenia and 7038 healthy subjects pooled across 41 international cohorts from the ENIGMA, non-ENIGMA cohorts and public datasets. Using the Subtype and Stage Inference (SuStaIn) algorithm, we identify two distinct neurostructural subgroups by mapping the spatial and temporal 'trajectory' of gray matter change in schizophrenia. Subgroup 1 was characterized by an early cortical-predominant loss with enlarged striatum, whereas subgroup 2 displayed an early subcortical-predominant loss in the hippocampus, striatum and other subcortical regions. We confirmed the reproducibility of the two neuro-structural subtypes across various sample sites, including Europe, North America and East Asia. This imaging-based taxonomy holds the potential to identify individuals with shared neurobiological attributes, thereby suggesting the viability of redefining existing disorder constructs based on biological factors.

**Permanent Link:** <https://hdl.handle.net/11104/0357627>

0600283 - ÚI 2025 RIV GB eng J - Journal Article

**Figuroa-Garcia, J.C. - [Neruda, Roman](#) - Hernandez-Perez, G. H.**

On cosine fuzzy sets and uncertainty quantification.

*Engineering Applications of Artificial Intelligence*. Roč. 138, Part A (2024), č. článku 109241. ISSN 0952-1976. E-ISSN 1873-6769

**Institutional support:** RVO:67985807

**Keywords :** Compact fuzzy sets \* Cosine membership function \* Uncertainty quantification

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

**Impact factor:** 7.5, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.1016/j.engappai.2024.109241>

**DOI:** <https://doi.org/10.1016/j.engappai.2024.109241>

This paper presents a definition of a generalized cosine-based fuzzy set, its application into simulation problems and uncertainty quantification in order to cover both aleatoric and epistemic uncertainties commonly seen in non-probabilistic models. The proposed cosine fuzzy set is able to represent different shapes via a parameter

which operates as the power of a cosine-type function adding flexibility to its behavior. Some special cases, some of its properties and a random variate generation method are described and applied into three examples: a random variate example and uncertainty quantification for two benchmark functions.

**Permanent Link:** <https://hdl.handle.net/11104/0357634>

0600136 - ÚVGZ 2025 RIV US eng J - Journal Article

**[Janků, Zdeněk](#) - [Geletič, Jan](#) - [Lehnert, M.](#) - [Dobrovolný, Petr](#)**

The Increase in Urban Heat Due to Global Warming Can be Significantly Affected by the Structure of the Land Use and Land Cover.

*International Journal of Climatology*. Online First, OCT (2024). ISSN 0899-8418. E-ISSN 1097-0088

**Grant - others:**AV ČR(CZ) StrategieAV21/23

**Program:** StrategieAV

**Institutional support:** RVO:86652079 ; RVO:67985807

**Keywords :** local climate zones \* euro-cordex \* surface temperatures \* island \* city \* model \* simulation \* indexes \* impact \* cities \* climate indices \* Czech Republic \* land use and land cover \* landscape fragmentation \* model simulation \* muklimo\_3 \* urban climate \* urban heat



**OECD category:** Meteorology and atmospheric sciences; Meteorology and atmospheric sciences (UIVT-O)

**Impact factor:** 3.5, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://rmets.onlinelibrary.wiley.com/doi/10.1002/joc.8642>

**DOI:** <https://doi.org/10.1002/joc.8642>

Urban populations are increasingly exposed to excessive heat. Heat distribution in the urban environment can be affected by several factors, including the spatial arrangement of land use/land cover (LULC) that is specific to a given city. This study applies a climate model with urban canopy parameterisation to downscale future climate projections and simulate the spatio-temporal pattern of heat in the urban environment to better understand the effect of LULC structure on its distribution. Heat conditions are characterised by climate indices that are well representative in two mid-sized Central European cities of Brno and Ostrava (Czech Republic). Our results show that the annual number of hot days (HOT), summer days (SUD), tropical nights (TRN) and warm nights (WAN) will increase significantly ( $p < 0.01$ ) in the 21st century in both cities. The model also simulates a more intensive increase and a higher spatio-temporal variability in all indices in Brno compared to Ostrava. In Brno, the annual number of HOT and TRN is projected to be more than 500% of the 1981-2010 reference period's value by the end of the 21st century under the RCP 8.5 scenario. To determine the causes of the differences in heat distribution, we applied LULC configuration metrics and correlation analysis using various geographical factors. The higher risk of urban heat in Brno compared to Ostrava can be attributed to a more homogenised and less fragmented LULC structure and to the more substantial role of altitude in the complex terrain of Brno. Other factors, such as the presence of impervious surfaces and vegetation, have a similar effect on the variability of the studied indices in both cities. Urban planners should consider the role of the LULC structure and the changes that can be made in a city when designing adaptation measures to mitigate the effects of urban heat.

**Permanent Link:** <https://hdl.handle.net/11104/0357487>

0600768 - ÚI 2025 RIV NL eng J - Journal Article

**Dropka, N. - Petkovic, M. - Böttcher, K. - Holeňa, Martin**

Unraveling conditions for W-shaped interface and undercooled melts in Cz-Si growth: A smart approach.

*Journal of Crystal Growth*. Roč. 648, December 2024 (2024), č. článku 127897. ISSN 0022-0248. E-ISSN 1873-5002

**Institutional support:** RVO:67985807

**Keywords :** Computer simulation \* Fluid flows \* Czochralski method \* Semiconducting silicon

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

**Impact factor:** 1.7, year: 2023

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.1016/j.jcrysgro.2024.127897>

**DOI:** <https://doi.org/10.1016/j.jcrysgro.2024.127897>

In Cz-Si growth, concave and W-shaped solid-liquid interfaces and undercooled melts are primary contributors to the degradation of crystal quality, particularly structure loss, defect generation, non-uniform dopant distribution, and crystal twisting, making their avoidance crucial. We employed a classification tree machine learning approach to investigate the importance of 15 process and furnace design parameters and their critical ranges for the formation of various types of W-shaped interfaces and undercooled melts at different scales, both in dimensional and dimensionless forms, and across a

wide range of process conditions. Moreover, symbolic regression was used to predict minimal melt temperature based on the aforementioned inputs. Training data were obtained by CFD modeling. The classification tree for combined output identified the Grashof, Reynolds for crystal, and Stefan numbers, along with the percentage of silicon solidified, as the most decisive inputs. Symbolic regression for the temperature of undercooled melt highlighted crucible diameter, pulling rate, and the power of the bottom heater as key parameters.

**Permanent Link:** <https://hdl.handle.net/11104/0358067>

0601561 - ÚI 2025 RIV CZ cze J - Journal Article

**Vignerová, J. - Sedlák, P. - Paulová, M. - Riedlová, J. - [Brabec, Marek](#) - Procházka, B.**

Růstové grafy v české pediatričké praxi.

[Growth charts in Czech pediatric practice.]

*Československá pediatrie*. Roč. 79, Suppl. 3 (2024), s. 35-40. ISSN 0069-2328

**Institutional support:** RVO:67985807

**Keywords :** růstové grafy \* referenční údaje \* celostátní antropologické výzkumy \* dlouhodobé změny růstu \* growth charts \* reference data \* national anthropological researches \* long-term growth changes

**OECD category:** Statistics and probability

**Method of publishing:** Limited access

**DOI:** <https://doi.org/10.55095/CSPediatrie2024/050>

Růstové grafy pro českou dětskou populaci jsou konstruovány na základě rozsáhlých Celostátních antropologických výzkumů dětí a mládeže ve věku od narození do 18 let (CAV). Grafy BMI a hmotnostně-výškového poměru jsou konstruované na základě dat CAV 1991. Růstové grafy ostatních tělesných rozměrů (tělesné délky, tělesné výšky a grafy obvodů hlavy, levé paže, břicha, boků a obvodu břicha k tělesné výšce) pocházejí z roku 2001. Opakované celostátní výzkumy umožnily popsat dlouhodobé trendy růstu české populace (zvyšování průměrné tělesné výšky, posun adipozity rebound a středního věku nástupu menarché/mutace do nižšího věku). Podíl dětí s nadváhou a obezitou se stále zvyšuje, a to ve všech věkových kategoriích u obou pohlaví. Nepodařilo se realizovat další CAV, který by zachytil pokračující trendy růstu a vývoje dětí, a umožnil tak aktualizaci veškerých růstových grafů. U grafů BMI by bylo nutné přihlídnout, pokud možno, k zachování nebo přiblížení ke stávajícím hraničním hodnotám pro nadváhu a obezitu, ale i nízkou hmotnost zejména proto, aby nedošlo ke změkčení normy. Stávající národní růstové grafy pro českou populaci považujeme stále za vhodnější variantu než přechod na grafy WHO 2007 nebo CDC 2000

The growth charts for the Czech pediatric population are constructed on the basis of extensive Nationwide anthropological surveys of children and youth aged birth to 18 years (NAS). The BMI and weight-for-height charts are constructed on the basis of NAS 1991 data. Growth charts for other parameters (body length, body height, head circumference, left arm circumference, abdominal and gluteal circumferences as well as abdominal circumference-for-height) are based on data from 2001. Multiple nationwide surveys allowed describing the long-term growth trends of the Czech population (increasing average body height, shift of adiposity rebound and mean age of onset of menarche/voice mutation to a younger age). The proportion of overweight and obese children continues to increase, in all age categories for both sexes. It was not possible to organize another NAS that could describe continuing trends in the child's growth and development, which resulted in impossibility of updating current growth charts. For BMI charts, consideration should be given, where possible, to maintaining or approaching the current cut-offs for overweight and obesity, but also underweight, particularly to avoid softening the normative values. We still consider the current national growth charts for the Czech population to be a more appropriate option than switching to the WHO 2007 or CDC 2000 charts.

**Permanent Link:** <https://hdl.handle.net/11104/0358747>

0600413 - ÚI 2025 RIV JP eng J - Journal Article

**Cignarale, G. - [Kuznets, Roman](#)**

A priori Belief Updates as a Method for Agent Self-recovery.

*Review of Analytic Philosophy*. Roč. 4, č. 1 (2024), s. 1-37. ISSN 2435-7375. E-ISSN 2435-7383

**Institutional support:** RVO:67985807

**Keywords :** Distributed systems \* Dynamic epistemic logic \* a priori beliefs \* Philosophy of computation \* Self-adaptive and self-organizing systems

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

**Method of publishing:** Open access

**Result website:**

<https://doi.org/10.18494/SAM.RAP.2024.0021>

**DOI:** <https://doi.org/10.18494/SAM.RAP.2024.0021>

Standard epistemic logic is concerned with describing agents' epistemic attitudes given the current set of alternatives the agents consider possible. While distributed systems can be (and often are) discussed without mentioning epistemics, it has been well established that epistemic phenomena lie at the heart of what agents, or processes, can and cannot do. Dynamic epistemic logic (DEL) aims to describe how epistemic attitudes of the agents/processes change based on the new information they receive, e.g., based on their observations of events and actions in a distributed system. In a broader philosophical view, this appeals to an a posteriori kind of reasoning, where agents update the set of alternatives considered possible based on their "experiences." Until recently, there was little incentive to formalize a priori reasoning, which plays a role in designing and maintaining distributed systems, e.g., in determining which states must be considered possible by agents in order to solve the distributed task at hand, and consequently in updating these states when unforeseen situations arise during runtime. With systems becoming more and more complex and large, the task of fixing design errors "on the fly" is shifted to individual agents, such as in the increasingly popular self-adaptive and self-organizing (SASO) systems. Rather than updating agents' a posteriori beliefs, this requires modifying their a priori beliefs about the system's global design and parameters. The goal of this paper is to provide a formalization of such a priori reasoning by using standard epistemic semantic tools, including Kripke models and DEL-style updates, and provide heuristics that would pave the way to streamlining this inherently nondeterministic and ad hoc process for SASO systems.

**Permanent Link:** <https://hdl.handle.net/11104/0357735>

0600572 - MÚ 2026 RIV NL eng J - Journal Article

**[Akbar Tabatabai, Seyed Amirhossein - \[Jalali, Raheleh\]\(#\)](#)**

Universal proof theory: Feasible admissibility in intuitionistic modal logics.

*Annals of Pure and Applied Logic*. Roč. 176, č. 2 (2025), č. článku 103526. ISSN 0168-0072. E-ISSN 1873-2461

**R&D Projects:** GA ČR(CZ) GA23-04825S; GA ČR(CZ) GA22-01137S

**Institutional support:** RVO:67985840

**Keywords :** admissible rules \* feasible disjunction property \* intuitionistic modal logics

**OECD category:** Pure mathematics; Pure mathematics (UIVT-O)

**Impact factor:** 0.6, year: 2023

**Method of publishing:** Limited access

**Result website:**

<https://doi.org/10.1016/j.apal.2024.103526>

**DOI:** <https://doi.org/10.1016/j.apal.2024.103526>

We introduce a general and syntactically defined family of sequent-style calculi over the propositional language with the modalities  $\{\Box, \Diamond\}$  and its fragments as a formalization for constructively acceptable systems. Calling these calculi constructive, we show that any strong enough constructive sequent calculus, satisfying a mild technical condition, feasibly admits all Visser's rules. This means that there exists a polynomial-time algorithm that, given a proof of the premise of a Visser's rule, provides a proof for its conclusion. As a positive application, we establish the feasible admissibility of Visser's rules in sequent calculi for several intuitionistic modal logics, including CK, IK, their extensions by the modal axioms T, B, 4, 5, and the axioms for bounded width and depth and their fragments  $CK_{\Box}$ , propositional lax logic and IPC. On the negative side, we show that if a strong enough intuitionistic modal logic (satisfying a mild technical condition) does not admit at least one of Visser's rules, it cannot have a constructive sequent calculus. Consequently, no intermediate logic other than IPC has a constructive sequent calculus.

**Permanent Link:** <https://hdl.handle.net/11104/0357882>

0601891 - FZÚ 2025 RIV US eng J - Journal Article

**Aceró, M. A. - Acharya, B. - Adamson, P. - Filip, Peter - Hák, František - Lokajíček, Miloš - Zálešák, Jaroslav**

Search for CP-violating neutrino nonstandard interactions with the NOvA experiment.

*Physical Review Letters*. Roč. 133, Nov (2024), č. článku 201802. ISSN 0031-9007. E-ISSN 1079-7114

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004632

**Research Infrastructure:** Fermilab-CZ III - 90261

**Institutional support:** RVO:68378271 ; RVO:67985807

**Keywords :** neutrino/e: particle identification \* NOvA \* neutrino: detector

**OECD category:** Particles and field physics

**Impact factor:** 8.1, year: 2023

**Method of publishing:** Open access

**DOI:** <https://doi.org/10.1103/PhysRevLett.133.201802>

This Letter reports a search for charge-parity (CP) symmetry violating nonstandard interactions (NSI) of neutrinos with matter using the NOvA Experiment, and examines their effects on the determination of the standard oscillation parameters. Data from  $\nu_{\mu}(\bar{\nu}_{\mu}) \rightarrow \nu_{\mu}(\bar{\nu}_{\mu})$  and  $\nu_{\mu}(\bar{\nu}_{\mu}) \rightarrow \nu_e(\bar{\nu}_e)$  oscillation channels are used to measure the effect of the NSI parameters  $\epsilon_{e\mu}$  and  $\epsilon_{e\tau}$ . With 90% CL the magnitudes of the NSI couplings are constrained to be  $|\epsilon_{e\mu}| \leq 0.3$  and  $|\epsilon_{e\tau}| \leq 0.4$ . A degeneracy at  $|\epsilon_{e\tau}| \approx 1.8$  is reported, and we observe that the presence of NSI limits sensitivity to the standard CP phase  $\delta_{CP}$ .

**Permanent Link:** <https://hdl.handle.net/11104/0359182>

0600834 - ÚTIA 2025 RIV CZ eng C - Conference Paper (international conference)

**Daniel, Milan - Kratochvíl, Václav**

On cardinalities of different degrees of Belief functions conjunctive conflictness.

*Proceedings of the 24th Czech-Japan Seminar on Data Analysis and Decision Making*. Praha: ÚTIA AV ČR, 2024, s. 14-25. ISBN 978-80-905688-0-8.

[Czech-Japan Seminar on Data Analysis and Decision Making 2024 /24./, Telč (CZ), 09.09.2024-12.09.2024]

**Institutional support:** RVO:67985556 ; RVO:67985807

**Keywords :** belief function \* conflict \* degree of conflict

**OECD category:** Applied mathematics

**Result website:**

<https://cjs.utia.cas.cz/2024/proceedings.pdf#section.0.2> <https://library.utia.cas.cz/separaty/2024/MTR/kratochvil-0600834.pdf>

This paper examines mutual conflict behavior between belief function structures across different discernment frame sizes ( $\Omega$ ). Through experiments on  $\Omega_2$  to  $\Omega_6$ , we observe that as frame size increases, non-conflicting pairs and higher-order hidden conflicts become exceedingly relatively rare despite the exponential growth of cardinalities of their classes. The super-exponential growth of possible belief structures complicates exhaustive analysis, leading us to employ random sampling. Our findings reveal that the cardinality of a class of first-degree hidden conflicts ( $HC_1$ ) grows faster than non-conflicts as frame size increases, highlighting the challenges and implications of applying belief function theory in complex decision-making scenarios.

**Permanent Link:** <https://hdl.handle.net/11104/0358254>

0600652 - ÚI 2025 RIV CH eng C - Conference Paper (international conference)

**Kalina, Jan - Vidnerová, Petra**

On the Bayesian Interpretation of Robust Regression Neural Networks.

*Artificial Neural Networks and Machine Learning – ICANN 2024. Proceedings Part I.* Cham: Springer, 2024 - (Wand, M.; Malinovská, K.; Schmidhuber, J.; Tetko, I.), s. 30-40. Lecture Notes in Computer Science, 15016. ISBN 978-3-031-72331-5.

[ICANN 2024: International Conference on Artificial Neural Networks /33./. Lugano (CH), 17.09.2024-20.09.2024]

**R&D Projects:** GA ČR(CZ) GA22-02067S

**Institutional support:** RVO:67985807

**Keywords :** Bayesian estimation \* Regularization \* Regression \* Neural networks \* Robust estimation

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

**Result website:**

[https://doi.org/10.1007/978-3-031-72332-2\\_3](https://doi.org/10.1007/978-3-031-72332-2_3)

**DOI:** [https://doi.org/10.1007/978-3-031-72332-2\\_3](https://doi.org/10.1007/978-3-031-72332-2_3)

The aim of this work is to search for intuitive interpretations of regularized regression procedures within the framework of Bayesian inference. First, the paper considers Bayesian estimation of parameters of the linear regression model. Second, regularized neural networks are explained to correspond to the Bayesian approach obtained under specific assumptions. The contribution is a unique compact look on training neural networks with available prior information, i.e. a likelihood-based perspective of training neural networks. Attention is also paid to very recently proposed regularized versions of robust neural networks, as a novelty, these are expressed by means of quasi-likelihood and their connection to Bayesian reasoning is discussed as well.

**Permanent Link:** <https://hdl.handle.net/11104/0357957>

0600830 - ÚI 2025 RIV eng C - Conference Paper (international conference)

**Šmíd, Matěj - Duník, J.**

Online Learning and Control for Data-Augmented Quadrotor Model.

*IFAC-PapersOnLine. Volume 58, Issue 15. 20th IFAC Symposium on System Identification SYSID 2024.* Amsterdam: Elsevier, 2024 - (Rivera, D.), s. 223-228. ISSN 2405-8971. E-ISSN 2405-8963.

[SYSID 2024: IFAC Symposium on System Identification /20./. Boston (US), 17.07.2024-19.07.2024]

**Institutional support:** RVO:67985807

**Keywords :** Data-augmented physics-based model \* Adaptive control \* Gaussian processP \* redictive control \* Quadrotor \* Gazebo

**Result website:**

<https://doi.org/10.1016/j.ifacol.2024.08.532>

**DOI:** <https://doi.org/10.1016/j.ifacol.2024.08.532>

The ability to adapt to changing conditions is a key feature of a successful autonomous system. In this work, we use the Recursive Gaussian Processes (RGP) for identification of the quadrotor air drag model online, without the need to precollect training data. The identified drag model then augments a physics-based model of the quadrotor dynamics, which allows more accurate quadrotor state prediction with increased ability to adapt to changing conditions. This data-augmented physics-based model is utilized for precise quadrotor trajectory tracking using the suitably modified Model Predictive Control (MPC) algorithm. The proposed modelling and control approach is evaluated using the Gazebo simulator and it is shown that the proposed approach tracks a desired trajectory with a higher accuracy compared to the MPC with the non-augmented (purely physics-based) model.

**Permanent Link:** <https://hdl.handle.net/11104/0358094>

0600285 - ÚI 2025 RIV DE eng C - Conference Paper (international conference)

**Holeňa, Martin - Koza, J.**

Suitability of Modern Neural Networks for Active and Transfer Learning in Surrogate-Assisted Black-Box Optimization.

*Interactive Adaptive Learning 2024: Proceedings of the Workshop on Interactive Adaptive Learning*. Aachen: Technical University & CreateSpace Independent Publishing, 2024 - (Bunse, M.; Herde, M.; Kreml, G.; Lemaire, V.; Tharwat, A.; Pham, M.; Saadallah, A.), s. 47-67. CEUR Workshop Proceedings, 3770. ISSN 1613-0073.

[IAL 2024: International Workshop & Tutorial on Interactive Adaptive Learning /8./. Vilnius (LT), 09.09.2024-09.09.2024]

**Institutional support:** RVO:67985807

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

**Result website:**

<https://www.activeml.net/ial2024/pdf/paper6.pdf>

Active learning plays a crucial role in black-box optimization, especially for objective functions that are expensive to evaluate. Continuous black-box optimization has adopted an approach called surrogate modelling, where the original black-box objective is approximated with a regression model. An active learning task in this context is to decide which points should be evaluated using the original objective to update the surrogate model. Apart from low-order polynomials, the first surrogate models were artificial neural networks of the kinds multilayer perceptron and radial basis function network. In the late 2000s, neural networks have been superseded by other kinds of surrogate models, primarily Gaussian processes. However, over the last 15 years, neural networks have seen significant and successful development, suggesting that they once again have the potential to serve as promising surrogate models. This paper reviews possible research directions concerning that potential, and recalls initial results from investigations in some of these directions. Finally, it contributes to those results by investigating the state-of-the-art black-box optimizer CMA-ES surrogate-assisted by two variants of random-activation-function neural network ensembles.

**Permanent Link:** <https://hdl.handle.net/11104/0357635>

0601150 - ÚI 2025 RIV eng U - Conference, Workshop Arrangement

**Martinková, Patrícia**

Psychometric Methods for Analysis of Wellbeing in the Context of Digital Technologies (symposium).

[Prague, 18.07.2024-18.07.2024, (W-WRD)]

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Result website:** [https://www.psychometricsociety.org/sites/main/files/file-attachments/imps\\_2024\\_full\\_program.pdf?1720860352#page=21](https://www.psychometricsociety.org/sites/main/files/file-attachments/imps_2024_full_program.pdf?1720860352#page=21)

This symposium explores novel psychometric methods in the evolving landscape of utilizing digital technologies to enhance physical, psychological, and social wellbeing. The symposium opens with an introduction to the DigiWELL project (2024-2028) related to these topics. The first presentation by Misha Pavel will delve into the main challenges in utilizing intensive longitudinal data (ILD) to improve wellbeing, and will offer novel approaches that blend machine learning with mechanistic modeling to capture the dynamics of individuals. The second talk by Oriol J. Bosch addresses the reliability of digital trace data in media exposure measures, employing a multiverse of measurements analysis to enhance understanding of web tracking measures, their quality, and the impact of design choices. The third talk by Young Won Cho focuses on handling non-ignorable missingness in ILD through joint modeling, offering guidance on fitting dynamic models in scenarios with data missing not at random. The fourth presentation by David Lacko explores the utilization of dynamic structural equation modeling on ILD of digital media use, presenting opportunities for communication scholars to examine short-term, person-specific, and reciprocal media effects. The last talk by Jaroslav Hlinka outlines an approach for quantification, testing, treatment, and interpretation of non-gaussian dependences in intensive longitudinal data, discussing lessons learned from complex dynamical systems, particularly the assessment of the role of specific temporal patterns and signal nonstationarities. Throughout the symposium, Steriani Elavsky will serve as the discussant.

**Permanent Link:** <https://hdl.handle.net/11104/0358362>

0600847 - ÚI 2025 CZ cze N - Newspaper Article

**Bohata, J. - [Paluš, Milan](#)**

Informatiči odhalují příčiny bouří i krachů.

*MF Dnes*. Roč. 2024, 31. 7. 2024 (2024), s. 14-14. ISSN 1210-1168

**Institutional support:** RVO:67985807

Extrémní výkyvy počasí, geomagnetické bouře, krachy na finančních trzích anebo třeba epileptické záchvaty. Vznik těchto jevů i to, jak je předvídat a tím před nimi varovat, analyzují badatelé z libeňského Ústavu informatiky Akademie věd (ÚI AV ČR). Nejde o jediné pražské vědecké pracoviště, které se aktuálně zabývá tím, jak moderní technologie mohou pomoci např. vážně nemocným.

**Permanent Link:** <https://hdl.handle.net/11104/0358110>

0600852 - ÚI 2025 cze E - Electronic Document

**Kropáčková, R. - [Paluš, Milan](#)**

Věda plus (10. září 2024).

Praha: Český rozhlas PLUS, 2024

**Institutional support:** RVO:67985807

**Result website:**

<https://www.mujrozhlas.cz/veda-plus/mozny-termin-startu-rakety-falcon-9-s-kosmickou-lodi-crew-dragon-v-ramci-mise-polaris?t=644>

Co je při extrémních projevech počasí příčina a následek? Novou matematickou metodu, která popisuje právě kauzalitu při extrémních událostech, vyvinuli vědci z Ústavu informatiky Akademie věd. Pomocť by mohla třeba k lepšímu řízení rizik v zemědělství.

Výkyvy počasí, epileptické záchvaty, geomagnetické bouře nebo krachy na finančních trzích. Co mají tyto události společného? Všechny ovlivňují lidské zdraví, ekonomiku a přírodu a všechny také můžeme označit za extrémní a často nečekané. A právě na tento jev se zaměřili vědci z Ústavu informatiky Akademie věd. Při zkoumání příčin a následků extrémních jevů vyvinuli novou matematickou metodu, která pomůže odhalit třeba příčinu jarních mrazů, jež zasáhly francouzské vinaře. Výsledky jejich výzkumu zveřejnil časopis Science Advances.

**Permanent Link:** <https://hdl.handle.net/11104/0358114>

0600129 - ÚI 2025 A - Abstract

**Hnát, T. - Fulínová, K. - Kala, P. - [Brabec, Marek](#) - Honěk, J.**

Predictors of early left ventricular reverse remodelling and prognosis in new-onset heart failure of non-ischemic origin.

*European Journal of Heart Failure*. Roč. 26, Suppl. 2 (2024), s. 81-82. ISSN 1388-9842. E-ISSN 1879-0844

**Institutional support:** RVO:67985807

**Result website:**

<https://doi.org/10.1002/ejhf.3326>

**DOI:** <https://doi.org/10.1002/ejhf.3326>

**Permanent Link:** <https://hdl.handle.net/11104/0357485>

0600282 - ÚI 2025 eng A - Abstract

**[Hartman, David](#) - Hons, T. - [Nešetřil, J.](#)**

First-order limits and rooted inverse problems.

*Logic Colloquium 2024 Program*.

[Logic Colloquium 2024. 24.06.2024-28.06.2024, Göteborg]

**Institutional support:** RVO:67985807

**Result website:**

<https://lc2024.se/talks/ct21-2/>

The field of graph convergence studies asymptotic properties of large graphs with the goal to define a well-behaved notion of a limit structure for a convergent sequence of graphs. The two most prominent types of convergence are defined for sequences of dense and sparse graphs. These were recently unified by Nešetřil and Ossona de Mendez into a common framework called first-order convergence using the expressive power of first-order logic. Moreover, the flexibility of this framework has since led to studies of convergence for other structures, such as matroids and mappings. An important problem in the field is which objects can actually be approximated by finite structures, that is, to arise as a limit. This seems to be a very difficult problem (cf. Aldous-Lyons conjecture). We thus restrict ourselves to a simplified problem to approximate vertices of the limit object, which we call rooted inverse problem. This can be viewed as an attempt to trace the origin of limit's vertices to the finite structures. The rooted inverse problem was first defined by Nešetřil and Ossona de Mendez and answered negatively in general by Christofides and Král'. However, they also proved that almost all vertices of the limit can be approximated. Later, we proved that this includes algebraic vertices. Here we show that all vertices of the limit can be approximated given that the limit is sparse enough. We conjecture that all the vertices can be approximated if the limit is NIP.

**Permanent Link:** <https://hdl.handle.net/11104/0357632>

0601179 - ÚI 2025 RIV CZ A - Abstract

**[Martinková, Patrícia](#)**

Analýza položek vícepoložkových měření.

*ROBUST 2024: Sborník abstraktů*. Praha: Jednota českých matematiků a fyziků, 2024. s. 10-10.

[ROBUST 2024: Letní škola JČ(S)MF /23./ 08.09.2024-13.09.2024, Bardějov]

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Result website:**

<https://www.karlin.mff.cuni.cz/~antoch/robust24/abstrakty.pdf>

Měření v psychologii, pedagogice a v dalších sociálních vědách jsou často nepřesná a využívají proto většího množství položek či hodnotitelů. V příspěvku pojednáme o statistických metodách pro analýzu položek vícepoložkových měření. Pojednáme o modelech tzv. teorie odpovědi na položku (item response theory, IRT) a jejich vztahu s modely faktorové analýzy a modely zobecněné lineární a



nelineární regrese se smíšenými efekty. Dále popíšeme postupný vývoj modelů IRT pomocí empirických charakteristických křivek a zobecněných lineárních a nelineárních modelů (GLNM) s důrazem na didaktickou hodnotu takového přístupu. Nakonec představíme některé nové přístupy k odhadu parametrů a jejich praktickou implementaci.

**Permanent Link:** <https://hdl.handle.net/11104/0358392>

0601127 - ÚI 2025 RIV CZ A - Abstract

**[Martinková, Patrícia](#)**

Computational Aspects of Psychometric Methods and Beyond.

*IMPS 2024 Abstracts*. Prague: IMPS, 2024. s. 173-173.

[IMPS 2024: Annual Meeting of the Psychometric Society. 16.07.2024-19.07.2024, Prague]

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Result website:**

[https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024\\_abstracts.pdf?1720733361#page=211](https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024_abstracts.pdf?1720733361#page=211)

This talk introduces the research expanding upon the topics of the recently published book "Computational Aspects of Psychometric Methods: With R" (Martinková & Hladká, 2023). Focusing first on inter-rater reliability (IRR), we describe a flexible method for assessing heterogeneity in IRR with variance components models (Martinková et al., 2023) and discuss the relationship between the IRR and false positive rate (Bartoš & Martinková, 2024). Furthermore, we introduce innovative approaches for assessing item functioning and detecting heterogeneity in responses to multi-item measurements, proposing new iterative methods (Hladká et al., 2024a, 2024b) and Bayesian estimation algorithms (Pavlech & Martinková, 2024). We also discuss approaches incorporating more complex data, such as item wording (Štěpánek et al., 2023). Finally, we provide an overview of the software implementation, highlighting the ShinyItemAnalysis R package and interactive application (Martinková & Drabinová, 2018) and its new extendability option via add-on modules (Martinková et al., 2024).

**Permanent Link:** <https://hdl.handle.net/11104/0358329>

0601140 - ÚI 2025 RIV CZ A - Abstract

**[Cichrová, Michaela](#) - [Hladká, Adéla](#) - [Martinková, Patrícia](#)**

Differential item functioning: Effect sizes classification.

*IMPS 2024 Abstracts*. Prague: IMPS, 2024. s. 429-429.

[IMPS 2024: Annual Meeting of the Psychometric Society. 16.07.2024-19.07.2024, Prague]

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Result website:**

[https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024\\_abstracts.pdf?1720733361#page=467](https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024_abstracts.pdf?1720733361#page=467)

An important aspect of subsequent analysis in multi-item measurements involves checking for Differential Item Functioning (DIF), that is, identifying potentially biased items that function differently across distinct population groups. Numerous statistical procedures have been developed to detect DIF by testing the statistical significance of the item-level differences between groups. However, besides the statistical significance of DIF, it is also vital to assess its practical significance by examining the magnitude of the corresponding effect size measure. This is necessary because even practically "negligible" differences can be statistically significant. In this work, we review existing DIF effect size measures and the cut-off values used to classify the effect size magnitudes as "negligible" (A), "moderate" (B), and "large" (C) for logistic regression models and Item Response Theory models, both types of models in the case of binary items. The properties of the effect size measures and cut-

off values are evaluated through a simulation study for both uniform and non-uniform DIF. Based on the simulation study, several effect size measures seem to display unsatisfactory properties (e.g., dependence on sample size, inconsistent classification of the underlying DIF, underestimating of the true underlying effect size measure). We propose solutions to observed inconsistencies and issues.

**Permanent Link:** <https://hdl.handle.net/11104/0358348>

0601182 - ÚI 2025 RIV SI eng A - Abstract

[Cichrová, Michaela](#) - [Hladká, Adéla](#) - [Martinková, Patrícia](#)

Effect sizes for detection of differential item functioning.

*APPLIED STATISTICS 2024. Program and Abstracts.* Koper: Statistical Society of Slovenia, 2024 - (Kastrin, A.; Lusa, L.). s. 39-39. ISBN 978-961-94283-4-4.

[Applied Statistics 2024 /20./ 23.09.2024-25.09.2024, Koper]

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Result website:**

<https://as.mf.uni-lj.si/uploads/pdf/as2024book.pdf>

An analysis of multi-item measurements in educational or psychological assessments includes testing for Differential Item Functioning (DIF), that is, identifying items that function differently for distinct population groups, indicating potential bias. The presence of DIF can be tested using various statistical methods, such as those based on contingency tables, logistic regression, and item response theory models. For items with statistically significant DIF, it is important to assess the practical significance by quantifying the magnitude of DIF with an appropriate effect size measure. This is necessary because even differences with no practical impact may be statistically significant. In this work, we review existing DIF effect size measures and the cut-off values used to classify the effect size magnitudes for the Mantel-Haenszel test, SIBTEST, and model-based approaches. We conduct a simulation study to investigate the properties of these effect size measures and their existing classification guidelines. Based on the simulation study, we suggest updating some of the values. Additionally, we suggest appropriate cut-off values for effect size measures based on the area between the item characteristic curves, taking those based on the Mantel-Haenszel approach as a reference. Furthermore, we investigate the newly proposed cut-off values through an additional simulation study. We propose solutions to observed inconsistencies and issues, focusing on the practical implementation using the R software.

**Permanent Link:** <https://hdl.handle.net/11104/0358394>

0601131 - ÚI 2025 RIV CZ A - Abstract

[Netík, Jan](#) - [Martinek, Filip](#) - [Martinková, Patrícia](#)

Fine-tuning language models to predict item difficulty from wording.

*IMPS 2024 Abstracts.* Prague: IMPS, 2024. s. 309-309.

[IMPS 2024: Annual Meeting of the Psychometric Society. 16.07.2024-19.07.2024, Prague]

**R&D Projects:** GA MŠMT(CZ) EH22\_008/0004583

**Institutional support:** RVO:67985807

**Result website:**

[https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024\\_abstracts.pdf?1720733361#page=347](https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024_abstracts.pdf?1720733361#page=347)

Choosing a statistical model and accounting for uncertainty about this choice are important parts of the scientific process and are required for common statistical tasks such as parameter estimation, interval estimation, statistical inference, point prediction, and interval prediction. A canonical example is the choice of variables in a linear regression model. Many ways of doing this have been proposed, including Bayesian and penalized regression methods, and it is not clear which are best. We compare

21 popular methods via an extensive simulation study based on a wide range of real datasets. We found that three adaptive Bayesian model averaging methods performed best across all the statistical tasks and that two of these were also among the most computationally efficient. We also compared different priors on model space. Finally, we addressed the question of whether model averaging provides an advantage over model selection. This is joint work with Anupreet Porwal.

**Permanent Link:** <https://hdl.handle.net/11104/0358332>

0601933 - ÚI 2025 RIV AT eng A - Abstract

**Radović, J.** - Belda, M. - [Resler, Jaroslav](#) - [Eben, Kryštof](#) - [Bureš, Martin](#) - [Geletič, Jan](#) - [Krč, Pavel](#) - [Řezníček, Hynek](#) - [Fuka, V.](#)

Assessment of the optimal initial and boundary conditions for the LES-based model PALM.

*EGU General Assembly 2024 Programme*. Vienna: European Geosciences Union, 2024, č. článku EGU24-5167..

[EGU General Assembly 2024. 14.04.2024-19.04.2024, Vienna]

**R&D Projects:** GA TA ČR(CZ) TO01000219

**Institutional support:** RVO:67985807

**OECD category:** Meteorology and atmospheric sciences

**Result website:**

<https://doi.org/10.5194/egusphere-egu24-5167> <https://meetingorganizer.copernicus.org/EGU24/EGU24-5167.html>

**DOI:** <https://doi.org/10.5194/egusphere-egu24-5167>

Proper assessment of urban atmosphere and climate by physics-based Computational Fluid Dynamic (CFD) models has been a pressing topic in the urban modeling community. Due to the ever-increasing number of city dwellers, continuous urbanization, and consequent modification of the urban atmosphere, this topic is and will remain popular in the future. The most advanced microscale models widely used for urban boundary layer studies, typically based on the Large Eddy Simulation (LES) principle, are currently the ones whose higher accuracy and ability to capture physical processes in the urban atmosphere have been well-validated. However, to fully assess their reliability, the necessity of testing the influence of the initial and boundary conditions (IBC) on the model outputs is a crucial issue that needs to be addressed. Four different three-day episodes throughout the year 2019 have been modeled using the PALM model system for experiment purposes. Two of the episodes encompass extreme weather events (e.i., a heatwave and a bad air quality period), and the other two episodes are chosen to represent non-extreme and usual weather conditions. In this experiment, an ensemble of 16 different WRF model realizations differing in parameterization setup is created and it serves as a source of IBC for the PALM model simulations. Firstly, a method for optimal WRF ensemble member selection has been developed, based on which subgroup of the ensemble members has been selected for driving the microscale model. The microscale model 8 x 8 km simulation domain is located in the realistic urban area in the city of Prague, its horizontal resolution is 10m. Altogether, 14 simulations have been performed with identical configurations except for the driving conditions. The PALM model outputs have been evaluated against radio-soundings, and compared to the WRF model driving conditions, both quantitatively and qualitatively. This study shows that PALM model outputs are largely influenced by the imposed driving conditions and that the majority of errors originate from the mesoscale model, and propagate into the microscale simulation. The sensitivity of the microscale model on different IBCs is significant, but the PALM model is capable of attenuating the errors coming from the WRF model. Finally, the experiment stresses the importance of high-quality driving data and shows the complexity of the process of acquiring such data.

**Permanent Link:** <https://hdl.handle.net/11104/0359153>

0600825 - ÚI 2025 A - Abstract

**Sedlár, Igor**

Alan Turing: život ve výpočtech.

[Den otevřených dveří Ústavu informatiky AV ČR 2024. Praha, 06.11.2024-06.11.2024]

**Event organizer:** Ústav informatiky AV ČR, v. v. i.

**URL events:** <https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

**Institutional support:** RVO:67985807

**Result website:**

<https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

Britský matematik Alan Turing (1912–1954) je pokládán za jednoho ze zakladatelů informatiky. Jeho práce zásadně ovlivnila podobu dnešního světa – formuloval jeden z prvních matematických modelů algoritmů, což vedlo k vývoji moderních počítačů, a jeho práce na prolamování šifer během druhé světové války přispěla k porážce nacistů. Nicméně, později byl perzekvován kvůli své sexuální orientaci a jeho život skončil sebevraždou. V přednášce vysvětlíme některé jeho vědecké výsledky, připomeneme důležité momenty jeho krátkého života na pozadí složité doby, ve které žil a nastíníme, jak jeho odkaz žije dál.

**Permanent Link:** <https://hdl.handle.net/11104/0358083>

0600824 - ÚI 2025 A - Abstract

**Vidnerová, Petra - Kadlecová, Gabriela**

Co se skrývá za AutoML?

[Den otevřených dveří Ústavu informatiky AV ČR 2024. Praha, 06.11.2024-06.11.2024]

**Event organizer:** Ústav informatiky AV ČR, v. v. i.

**URL events:** <https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

**Institutional support:** RVO:67985807

**Result website:**

<https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

Povíme si, jaké problémy pomáhá řešit automatické strojové učení (AutoML) a proč je dobré se jím zabývat. Zaměříme se na automatický návrh neuronových sítí. Řekneme si, jaké požadavky se dnes na takové sítě kladou, a jaká úskalí automatických návrhů přináší. Ukážeme, jak se tato úskalí snažíme překonávat na Ústavu informatiky a jak odhadujeme schopnosti neuronové sítě na základě jejích jednoduchých charakteristik.

**Permanent Link:** <https://hdl.handle.net/11104/0358080>

0600826 - ÚI 2025 A - Abstract

**Porubský, Štefan**

Hudební hra v kostky, neb jak vygenerovat menuet?

[Den otevřených dveří Ústavu informatiky AV ČR 2024. Praha, 06.11.2024-06.11.2024]

**Event organizer:** Ústav informatiky AV ČR, v. v. i.

**URL events:** <https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

**Institutional support:** RVO:67985807

**Result website:**

<https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

Na konci 18. st. se objevila nová společenská hra skládání hudby pomocí kostek. Nejdůležitějším předpokladem „skladatele“ byla schopnost číst noty a dostatečné ovládnutí hudebního nástroje. Z předpřipravených hudebních kousků pomocí házení kostkou složil poslouchatelný valčík nebo menuet. Dnes nepotřebujeme házet kostkou, dokonce ani umět číst noty. Ukážeme jak pomocí generátoru náhodných čísel a syntetizátoru můžeme využít k tomu určená díla Mozarta a dalších, a skládat hudbu.

**Permanent Link:** <https://hdl.handle.net/11104/0358085>

0600823 - ÚI 2025 A - Abstract

**[Jajcay, Nikola](#)**

Jak chaos proměnil vědu.

[Den otevřených dveří Ústavu informatiky AV ČR 2024. Praha, 06.11.2024-06.11.2024]

**Event organizer:** Ústav informatiky AV ČR, v. v. i.

**URL events:** <https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

**Institutional support:** RVO:67985807

**Result website:**

<https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

Na první pohled se chaos a věda jeví jako protiklady. Vědu vnímáme jako vysoce uspořádanou disciplínu, zatímco chaos je... no, chaos. To však nemůže být dále od pravdy. V této přednášce se v rychlosti seznámíme s tím, jak chaos proměnil téměř všechny vědecké disciplíny, usnadnil novou éru ve vědě a zahájil studium komplexních emergentních systémů, které nahradilo stará dogmata. Nahlédneme do okamžiku, kdy to všechno začalo, a během cesty se podíváme, jak chaos formuje neurovědu a klimatologii.

**Permanent Link:** <https://hdl.handle.net/11104/0358078>

0600769 - ÚI 2025 RIV A - Abstract

**[Krč, Pavel](#)**

Jak měřit tepelný komfort.

[Den otevřených dveří Ústavu informatiky AV ČR 2024. Praha, 06.11.2024-06.11.2024]

**Event organizer:** Ústav informatiky AV ČR, v. v. i.

**URL events:** <https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

**Grant - others:**AV ČR(CZ) StrategieAV21/30

**Program:** StrategieAV

**Institutional support:** RVO:67985807

**OECD category:** Meteorology and atmospheric sciences

**Result website:**

<https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs> <https://www.youtube.com/live/IHn9ynK8xj8?feature=share>

Zapnutý ventilátor teplotu vzduchu nesníží, venkovní teplomet ji téměř nezvýší, přesto oboje s úspěchem používáme, když je nám horko nebo zima. Co všechno ovlivňuje naše vnímání tepla? Dá se vůbec takto subjektivní vjem vyčíslit a změřit? Spousta světových měst, Prahu nevyjímaje, bojuje s častými vlnami veder a snaží se pro své obyvatele zajistit příjemnější prostředí, některá opatření se ale mohou míjet účinkem. Abychom se tomu vyhnuli, musíme umět vyhodnotit jejich dopad předem.

**Permanent Link:** <https://hdl.handle.net/11104/0358068>

0600827 - ÚI 2025 RIV cze A - Abstract

**[Krč, Pavel](#) - [Vlček, Kamil](#) - [Lhotka, Ondřej](#)**

Klimatická krize – panelová diskuze v kině Přítomnost.

[Týden Akademie věd České republiky 2024. Praha, 04.11.2024-10.11.2024]

**URL events:** <https://www.tydenavcr.cz/>

**Grant - others:**AV ČR(CZ) StrategieAV21/30

**Program:** StrategieAV

**Institutional support:** RVO:67985807

**OECD category:** Meteorology and atmospheric sciences

**Result website:** <https://www.tydenavcr.cz/program/akce?id=5773&a=klimaticka-krize--panelova-diskuze-v-kine-pritomnost>

Panelová diskuze se zaměří na klíčové otázky spojené s klimatickou změnou a jejími dopady na každodenní život. Odborníci budou diskutovat o očekávaných klimatických fenoménech, jako jsou stále častější horká léta, extrémní srážky a výrazné změny v přírodě. Tématem bude také, jak se jednotlivci i komunity mohou na tyto výzvy připravit – ať už jde o život ve městě či na venkově, cestování, bydlení nebo zemědělství.

**Permanent Link:** <https://hdl.handle.net/11104/0358087>

0601204 - ÚI 2025 RIV CZ A - Abstract

**Martinek, Filip - Netík, Jan - Martinková, Patrícia**

Predicting item difficulty with text analysis and machine learning in different languages and item types.

*IMPS 2024 Abstracts*. Prague: IMPS, 2024. s. 309-309.

[IMPS 2024: Annual Meeting of the Psychometric Society. 16.07.2024-19.07.2024, Prague]

**R&D Projects:** GA TA ČR(CZ) TL05000008

**Institutional support:** RVO:67985807

**Result website:**

[https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024\\_abstracts.pdf?1720733361#page=522](https://www.psychometricsociety.org/sites/main/files/file-attachments/imps2024_abstracts.pdf?1720733361#page=522)

In standardized testing, predicting item difficulty from item wording is useful both for test development as well as for deeper understanding of what makes an item a difficult one. Many features may influence item difficulty, such as the length of answer choices, their similarity with the item question, difficulty of the words used, etc., and different machine learning models may be used to predict item difficulty from item features (Štěpánek et al., 2023). However, differences and challenges may arise when building models for different item types (including those involving audio, or visual components), and for different languages. In this work, we extract item features from various types of test items from the English, German, and French as foreign languages Czech matura exams into various item features, and train numerous different machine learning models to predict their difficulty. We compare and analyze the models and features in order to create a tool that can analyze and suggest changes during test development to help achieve an optimal item difficulty.

**Permanent Link:** <https://hdl.handle.net/11104/0358415>

0600822 - ÚI 2025 A - Abstract

**Netík, Jan**

Měříme neviditelné: Jak fungují znalostní testy a proč při jejich tvorbě potřebujeme matematiku?

[Den otevřených dveří Ústavu informatiky AV ČR 2024. Praha, 06.11.2024-06.11.2024]

**Event organizer:** Ústav informatiky AV ČR, v. v. i.

**URL events:** <https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

**Institutional support:** RVO:67985807

**Result website:**

<https://www.cs.cas.cz/news/2024-11-06-Den-otevrenych-dveri/cs>

Znalostních testů jsme každý ve škole zažili stovky a to, jak fungují, nám připadá očividné. Odpovíme na otázky, učitel odpovědi oboduje, body sečte a udělí známku. Souvisí ale počet bodů skutečně s našimi znalostmi? Proč někdy spolužák, který se na rozdíl od vás skoro neučil, dostane více bodů než vy? Jak vlastně můžeme přiřadit něčemu nehmatatelnému, jako jsou znalosti, jedno číslo? To jsou jen některé otázky, které řeší vědecký obor zvaný psychometrie a na které v přednášce zkusíme odpovědět.

**Permanent Link:** <https://hdl.handle.net/11104/0358076>

0601368 - ÚI 2025 CZ cze O - Others

[Kalina, Jan](#)

Umělá inteligence (AI) (In: Poezie 2024 aneb Vesmír slov. Jindřichův Hradec: Epika, 2024 (TYLŠAR, František, a spol. 50 českých a světových autorů), s. 56. ISBN 978-80-7608-096-6.

2024

**Institutional support:** RVO:67985807

**Permanent Link:** <https://hdl.handle.net/11104/0358515>

0600001 - ÚI 2025 CZ cze O - Others

[Kalina, Jan](#)

Umělá inteligence (AI). (In: Poezie 2024 aneb Vesmír slov. Jindřichův Hradec: Epika, 2023 (TYLŠAR, František, a spol. 50 českých a světových autorů), s. 56. ISBN 978-80-7608-096-6.

2024

**Institutional support:** RVO:67985807

**Keywords :** Popularizace vědy \* Popularisation of science \* poezie \* poetry

**Permanent Link:** <https://hdl.handle.net/11104/0357374>