Záznamy vložené do ASEP za UI (1.8. – 31. 8. 2021)

0545089 - ÚI 2022 RIV CZ cze J - Článek v odborném periodiku
Krátká, Z. - Sedláčková, L. - Luxová, Š. - Hrubá, D. - Katina, Stanislav
COVID-19-free pracoviště: Vyšetření protilátek proti koronaviru jako základ testovací strategie ve firmách.
Časopis lékařů českých. Roč. 160, č. 4 (2021), s. 126-132. ISSN 0008-7335
Institucionální podpora: RVO:67985807
Klíčová slova: COVID-19 * SARS-CoV-2 * protilátky * séroprevalence * antigenní test * test PCR
Kód oboru RIV: BB - Aplikovaná statistika, operační výzkum
Obor OECD: Statistics and probability
https://www.prolekare.cz/casopisy/casopis-lekaru-ceskych/2021-4-5/covid-19-free-pracoviste-vysetreni-protilatek-proti-koronaviru-jako-zaklad-testovaci-strategie-ve-firmach-127892

Česko patří mezi země nejvíce zasažené koronavirovou pandemií – přibližně 16 % obyvatel mělo pozitivní test PCR, 2–3x více lidí prodělalo infekci bez podstoupení tohoto vyšetření. Pro zaměstnavatele je velmi užitečné vědět, kolik zaměstnanců již infekci prodělalo a pro kolik osob je koronavirus nadále rizikový. Za tímto účelem je vhodné vyšetřit IgG protilátky. V současné době je však strategie testování jiná – povinně se provádí testování antigenními testy s cílem hledat infekční osoby bez ohledu na imunitu lidí. Cílem této pilotní studie bylo stanovit počet imunních osob po prodělané infekci na třech klinikách GENNET, s. r. o. Současně se antigenními testy zjišťovala infekce u neočkovaných osob, které neprodělaly COVID-19 nebo jej prodělaly před více než 3 měsíci. Soubor zahrnoval 297 jedinců, z nichž 182 (61,3 %) nebylo očkováno a 115 (38,7 %) bylo po vakcinaci. Z neočkovaných mělo 71 (39 %) osob v anamnéze pozitivní test PCR, dalších 18 (9,9 %) mělo pozitivní IgG protilátky, aniž by věděly o prodělané infekci, a 38 (20,9 %) mělo negativní IgG protilátky. Zatím nevyšetřených bylo 55 (30,2 %) osob. Sečteme-li očkované s osobami s protilátkami, pak imunních bylo 74,3 % zaměstnanců kliniky GENNET Archa, 68 % zaměstnanců kliniky GENNET Kostelní a 58,1 % kliniky GENNET Liberec. Antigenním testem bylo ve 4 kolech vyšetřeno v průměru 153 osob (přičemž 60 z nich mělo protilátky). Infekce byla zjištěna u 2 osob. Obě patřily do skupiny bez vyšetřených protilátek. Žádná osoba s protilátkami neměla pozitivní antigenní test. Lidé, kteří mají protilátky po očkování nebo po infekci, jsou vůči opakované infekci odolné a je u nich nízké riziko, že budou nadále virus šířit. Vyšetřením protilátek zaměstnavatelé získají lepší přehled o situaci na pracovištích. Na základě naší studie doporučujeme zrušit plošné antigenní testování u osob s protilátkami.
Trvalý link: http://hdl.handle.net/11104/0321854

0545088 - ÚI 2022 RIV CH eng C - Konferenční příspěvek (zahraniční konf.)
Hartman, David - Pokorná, A.
Constructions of Betweenness-Uniform Graphs from Trees.
Extended Abstracts EuroComb 2021. Cham: Birkhäuser / Springer, 2021 - (Nešetřil, J.; Perarnau, G.; Rué, J.; Serra, O.), s. 732-738. Trends in Mathematics, 14. ISBN 978-3-030-83822-5.
[EUROCOMB 2021: The European Conference on Combinatorics, Graph Theory and Applications. Barcelona / Online (ES), 06.09.2021-10.09.2021]
Institucionální podpora: RVO:67985807
Klíčová slova: Graph theory * Betweenness centrality * Betweenness uniform
Kód oboru RIV: BA - Obecná matematika
Obor OECD: Pure mathematics
http://dx.doi.org/10.1007/978-3-030-83823-2_117
DOI: 10.1007/978-3-030-83823-2_117

Betweenness centrality is a measure of the importance of a vertex x inside a network based on the fraction of shortest paths passing through x. We study a blow-up construction that has been shown to produce graphs with uniform distribution of betweenness. We disprove the conjecture about this procedure's universality by showing that trees with a diameter at least three cannot be transformed into betweenness-uniform by the blow-up construction. It remains open to characterize graphs for which the blow-up construction can produce betweenness-uniform graphs.
Trvalý link: http://hdl.handle.net/11104/0321853

0545085 - ÚI 2022 GB eng J - Článek v odborném periodiku
Taxová Braunerová, R. - Kunešová, M. - Heinen, M. M. - Rutter, H. - Hassapidou, M. - Duleva, V. - Pudule, I. - Petrauskienė, A. - Sjöberg, A. - Lissner, L. - Spiroski, I. - Gutiérrez-

González, E. - Kelleher, C. - Bergh, I. H. - Metelcová, T. - Vignerová, J. - Brabec, Marek - Buoncristiano, M. - Williams, J. - Simmonds, P. - Zamrazilová, H. - Hainer, V. - Yngve, A. - Rakovac, Y. - Breda, J.
Waist circumference and waist-to-height ratio in 7-year-old children-WHO Childhood Obesity Surveillance Initiative.
Obesity Reviews. Online first 17 August 2021 (2021), č. článku e13208. ISSN 1467-7881. E-ISSN 1467-789X
Institucionální podpora: RVO:67985807
Klíčová slova: COSI * childhood obesity * waist circumference * waist-to-height ratio
Kód oboru RIV: BB - Aplikovaná statistika, operační výzkum
Obor OECD: Statistics and probability
Impakt faktor: 9.213, rok: 2020
http://dx.doi.org/10.1111/obr.13208
DOI: 10.1111/obr.13208

Childhood obesity is a serious global health problem. Waist circumference (WC) and waist-to-height ratio (WHtR) reflect body fat distribution in children. The objectives of this study were to assess WC and WHtR in 7-year-old children and to determine body mass index (BMI), WC, and WHtR differences in children from 10 selected countries across Europe (Bulgaria, Czechia, Greece, Ireland, Latvia, Lithuania, North Macedonia, Norway, Spain, and Sweden) participating in the World Health Organization (WHO) Europe Childhood Obesity Surveillance Initiative (COSI). The 50th and 90th percentile of WC (according to COSI and "Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infantS" (IDEFICS) cutoff values) and WHtR above 0.5 were used as measures of abdominal obesity in a unique sample of 38,975 children aged 7.00-7.99 years. Southern European countries, including Greece and Spain, showed significantly higher BMI, WC, and WHtRin both genders ($p < 0.0001$) than Eastern and Northern Europe. The highest values for WC were observed in Greece (60.8 ± 7.36 cm boys; 60.3 ± 7.48 cm girls), North Macedonia (60.4 ± 7.91 cm boys; 59.0 ± 8.01 cm girls), and Spain (59.7 ± 6.96 cm boys; 58.9 ± 6.77 cm girls). WC and WHtRin may add an information about the occurrence of central obesity in children.
Trvalý link: http://hdl.handle.net/11104/0321852

0545055 - ÚI 2022 US eng V - Výzkumná zpráva
Sedlár, Igor
Finitely-valued propositional dynamic logic.
Cornell University, 2020. 17 s. arXiv.org e-Print archive, arXiv:2012.12133 [cs.LO].
Grant CEP: GA ČR(CZ) GJ18-19162Y
Institucionální podpora: RVO:67985807
Kód oboru RIV: BA - Obecná matematika
https://arxiv.org/abs/2012.12133
Trvalý link: http://hdl.handle.net/11104/0321832

0544810 - ÚI 2022 FR eng A - Abstrakt
Bendová, V. - Katina, Stanislav - Nečas, L.
Analysis of Results of Total Knee Replacement Failure Using Cox Proportional Hazard Model with Time-Dependent Covariates.
ISCB 2021: 42nd Annual Conference of the International Society for Biostatistics: Final Programme & Book of Abstracts. Lyon: ISCB / University Lyon, 2021. s. 280-280.
[ISCB 2021: Annual Conference of the International Society for Biostatistics /42./. 18.07.2021-22.07.2021, Lyon]
Institucionální podpora: RVO:67985807

Total knee replacement (TKR) surgery is the most common treatment of osteoarthritis of the knee. Good health, as well as other factors, influence successful and prompt recovery of patients that underwent this surgery. Physicians are interested in quantifying the effect of patient's well-being on the failure of the TKR that might come during the follow-up. Therefore, their aim is to monitor health of patient before and after the TKR surgery. Two suitable tools for the assessment of patient's health state have been proposed: The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) along with the Knee Society Scoring System (KSS). Both have the ability to assess the subjective health state of a patient, while the KSS aspires to evaluate the objective health state as well. Our study includes data about 2295 patients, who have undergone primary TKR surgery between January 1st, 2006 and December 31st, 2019, from Orthopaedic Clinic of Martin University Hospital. The data were recorded in the Slovak Arthroplasty Register (SAR). WOMAC and KSS related

questionnaires have been recorded for each patient in the study in four time points during planned examinations: before TKR surgery, three months, six months, and 12 months after TKR surgery. The aim of this registry-based study is to show the relationship of primary TKR failure on WOMAC and KSS scores, age, sex, and diagnosis by means of Cox proportional hazards model with time-dependent covariates stratified based on type of implants, such as cruciate retaining, posterior stabilized condylar constrained and hinge knee implant. Statistical analyses were carried out using R software environment.
Trvalý link: http://hdl.handle.net/11104/0321618

0544805 - ÚI 2022 FR eng A - Abstrakt
Janošová, M. - Katina, Stanislav - Nečas, L.
Functional analysis of temporal data about patient's health condition after total knee replacement.
ISCB 2021: 42nd Annual Conference of the International Society for Biostatistics: Final Programme & Book of Abstracts. Lyon: ISCB / University Lyon, 2021. s. 245-245.
[ISCB 2021: Annual Conference of the International Society for Biostatistics /42./. 18.07.2021-22.07.2021, Lyon]
Institucionální podpora: RVO:67985807

Persistent knee pain while walking or at rest, often caused by osteoarthritis (destruction of cartilage and changes of its mechanical properties), leads to total knee replacement (TKR) using arthroplasty implants. Patient Reported Outcome Measure questionnaires (PROMs) are commonly used to evaluate patient's condition. Some of the most commonly used PROMs for patients after TKR are Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Knee Society Score (KSS). WOMAC was designed to measure patient's degree of pain, stiffness and functional limitations of the affected joint through patient's self-evaluation. KSS combines patient's objective and functional characteristics and is filled by attending physician. Both of these questionnaires are used at Martin University Hospital during examinations of patients after TKR, where the data about TKR are recorded in the Slovakian Arthroplasty Register (SAR). This study includes 2295 patients, who underwent primary TKR between January 1st, 2006 and December 31st, 2020. Patients were monitored before the surgery and then approximately 3, 6, 12, 24, and 36 months after the surgery. If a revision of primary TKR recorded in SAR was performed during the course of this follow-up, the patient is excluded from the subsequent statistical analyses. Our aim is to retrospectively evaluate patient's condition using their WOMAC scores and KSS and compare the condition and its changes through time among three structurally different types of knee implants, such as cruciate retaining, posterior stabilized condylar constrained and hinge knee implant, using functional data analysis and cubic splines. Statistical analyses were carried out using R software environment.
Trvalý link: http://hdl.handle.net/11104/0321612

0544804 - ÚI 2022 FR eng A - Abstrakt
Katina, Stanislav - Zámečník, S. - Hórová, I.
Kernel density estimation for circular data about COVID-19 in the Czech Republic.
ISCB 2021: 42nd Annual Conference of the International Society for Biostatistics: Final Programme & Book of Abstracts. Lyon: ISCB / University Lyon, 2021. s. 244-244.
[ISCB 2021: Annual Conference of the International Society for Biostatistics /42./. 18.07.2021-22.07.2021, Lyon]
Institucionální podpora: RVO:67985807

The term circular statistics describes a set of techniques used to model distributions of random variables that are cyclic in nature and these approaches can be easily adapted to temporal data recorded, e.g., daily, weekly or monthly. One of the nonparametric possibilities how to analyze these data is through kernel estimations of circular densities where the problem of how much to smooth, i.e., how to choose the bandwidth, is crucial. In this presentation we describe the existing methods: cross-validation method, smoothed cross-validation, adaptive method and propose their modifications. We apply these methods on real data from the Institute of health information and statistics of the Czech Republic about total (cumulative) number of persons with a proven COVID-19 infection according to regional hygienic stations, number of cured persons, number of deaths and tests performed for whole country and regions coded based on nomenclature of territorial units for Statistics (NUTS). The results are visualized as circular histograms (rose diagrams) and calculated standardized characteristics are superimposed with choropleth map, where NUTS are shaded in diverging color scheme. All statistical analyses are performed in the R software.
Trvalý link: http://hdl.handle.net/11104/0321611

0544802 - ÚI 2022 FR eng A - Abstrakt
Katina, Stanislav - Šindlář V.
Linear statistical models and ridge regression used in shape index calculation on human face.
ISCB 2021: 42nd Annual Conference of the International Society for Biostatistics: Final Programme & Book of Abstracts. Lyon: ISCB / University Lyon, 2021. s. 208-208.
[ISCB 2021: Annual Conference of the International Society for Biostatistics /42./. 18.07.2021-22.07.2021, Lyon]
Institucionální podpora: RVO:67985807

Spatial interpolation and smoothing is usually done for one surface. In our case, we have random samples of such surfaces represented by human faces captured by stereo-photogrammetry and characterised by about 150,000 points. These points are triangulated by about 300,000 triangles. The number of points is extremely high for the purpose of statistical analyses, therefore the 3D coordinates of (semi) landmarks on curves or surface patches sufficiently characterisingthe shape have to be automatically identified and this simplified model comprising about 1000 points is then used in further statistical modelling in functional data analysis setting. The identification of (semi)landmarks is a complex process during which B-splines, P-splines and thin-plate splines are used together with the measures of local surface topology, including principal curvatures and shape index. Shape index is calculated in R using different linear regression models and ridge regression model (allowing more flexibility for regression coefficients) of z coordinates on x and y coordinates, i.e. quadratic with interaction without/with intercept, cubic with interaction of x and y without/ with intercept (without/with other interactions), and similar models of higher order. The estimates of regression coefficients related to the quadratic terms and their interaction are elements of Weingarten matrix from which the principal curvatures are calculated. These models are applied on sufficiently large neighbourhood of all points in local 3D coordinate system. Since the measures of local surface topology represent principal guide in estimating locations of ridge and valley curves across the face, we aim to compare different regression models used in shape index calculation on faces of patients with facial palsy and healthy controls. We suggest to use quadratic or cubic linear regression model or ridge regression model with interaction of the first order without intercept.
Trvalý link: http://hdl.handle.net/11104/0321609

0544801 - ÚI 2022 FR eng A - Abstrakt
Klaschka, Jan - Malý, Marek - Šípek, A.
On heuristic detection of maternal-age-related increase of birth defect risk: Experience, issues, alternatives.
ISCB 2021: 42nd Annual Conference of the International Society for Biostatistics: Final Programme & Book of Abstracts. Lyon: ISCB / University Lyon, 2021. s. 269-269.
[ISCB 2021: Annual Conference of the International Society for Biostatistics /42./. 18.07.2021-22.07.2021, Lyon]
Institucionální podpora: RVO:67985807

One of the focuses of our research is detection of increased congenital anomaly (birth defect) risk related to high or low maternal age. The size and onset of the increase depend on the anomaly type. When events (anomalies) are frequent and the risk increase is big and takes place far from the age scale ends, joinpoint Poisson regression, for instance, may be a right choice. It fits well, for example, Czech 2013 – 2017 Down syndrome data (on both born children and terminated pregnancies), where it shows a consistent risk increase along the entire age scale, first slow, and accelerated since the age of 32. Such methods may, nevertheless, fail for rare anomalies with a moderate risk increase at age close to extremes. For such situations, we have designed, and presented at ISCB 2020 [1] a heuristic method. Each year on the age scale splits the scale into two opposite tails. Risks in the two tails are compared by relative risk (RR) and Fisher test. The attribute of suspect risk increase belongs to a tail if it yields RR over 2 and significant unadjusted Fisher test, or is nested within such tail. A stronger attribute of verified risk increase is given to tails with the former attribute that are nested within a tail with significant Bonferroni-adjusted Fisher test. A new alternative method variant compares all tails with a common reference age interval from the lower to the upper quartile. (Considered are tails disjoint with the interval.) Otherwise, the definitions of suspect and verified risk increase remain the same. Numerical differences between the two method variants on real data are minor. For example, the former variant finds a verified risk increase at 18 or less years, and the new one at 19 or less in the 1992 – 2016 anencephaly incidence. Both variants assess equally the risk increase from 42 years as suspect. The new variant is, however, more logically consistent, as it always transforms, unlike the former one, monotone risk by age curves into monotone RR by age curves.
Trvalý link: http://hdl.handle.net/11104/0321607

0544787 - ÚI 2022 CZ eng V - Výzkumná zpráva
Jiřina, Marcel
Nearly All Reals Can Be Sorted with Linear Time Complexity.
Prague: ICS CAS, 2021. 22 s. Technical Report, V-1285.
Grant CEP: GA MŠk LM2015068
Institucionální podpora: RVO:67985807
Klíčová slova: sorting * algorithm * real sorting key * time complexity * linear complexity

We propose a variant of the counting sort modified for sorting reals in a linear time. It is assumed that the sorting key and pointers to the items being sorted are moved and individual items remain at the same place in the memory (in place sorting). In this case, the space complexity of the new variant of the algorithm is the same as the complexity of the quicksort. We also quantify the practical limits for possible sorting reals in a linear time. This possibility is assured under additional assumptions on the distribution of the sorting key, mainly the independence and identity of the distribution. Here we give a more general criteria easily applicable in practice. We also show that the algorithm is applicable for data that do not fulfill criteria for linear time complexity but even that the computation is faster than the system quicksort. A new, faster version of the algorithm is attached.
Trvalý link: http://hdl.handle.net/11104/0321594

0544772 - ÚI 2022 RIV DE eng J - Článek v odborném periodiku
Resler, Jaroslav - Eben, Kryštof - Geletič, Jan - Krč, Pavel - Rosecký, Martin - Sühring, M. - Belda, M. - Fuka, V. - Halenka, T. - Huszár, P. - Karlický, J. - Benešová, N. - Ďoubalová, J. - Honzáková, K. - Keder, J. - Nápravníková, Š. - Vlček, O.
Validation of the PALM model system 6.0 in a real urban environment: a case study in Dejvice, Prague, the Czech Republic.
Geoscientific Model Development. Roč. 14, č. 8 (2021), s. 4797-4842. ISSN 1991-959X. E-ISSN 1991-9603
Grant CEP: GA KHP(CZ) UH0383; GA TA ČR(CZ) TO01000219
Institucionální podpora: RVO:67985807
Klíčová slova: urban meteorology * air quality * street canyon * CFD * LES * PALM * observations * model validation
Kód oboru RIV: DG - Vědy o atmosféře, meteorologie
Obor OECD: Meteorology and atmospheric sciences
Impakt faktor: 6.135, rok: 2020
DOI: 10.5194/gmd-14-4797-2021

In recent years, the PALM 6.0 modelling system has been rapidly developing its capability to simulate physical processes within urban environments. Some examples in this regard are energy-balance solvers for building and land surfaces, a radiative transfer model to account for multiple reflections and shading, a plant-canopy model to consider the effects of plants on flow (thermo)dynamics, and a chemistry transport model to enable simulation of air quality. This study provides a thorough evaluation of modelled meteorological, air chemistry, and ground and wall-surface quantities against dedicated in situ measurements taken in an urban environment in Dejvice, Prague, the Czech Republic. Measurements included monitoring of air quality and meteorology in street canyons, surface temperature scanning with infrared cameras, and monitoring of wall heat fluxes. Large-eddy simulations (LES) using the PALM model driven by boundary conditions obtained from a mesoscale model were performed for multiple days within two summer and three winter episodes characterized by different atmospheric conditions. For the simulated episodes, the resulting temperature, wind speed, and chemical compound concentrations within street canyons show a realistic representation of the observed state, except that the LES did not adequately capture night-time cooling near the surface for certain meteorological conditions. In some situations, insufficient turbulent mixing was modelled, resulting in higher near-surface concentrations. At most of the evaluation points, the simulated surface temperature reproduces the observed surface temperature reasonably well for both absolute and daily amplitude values. However, especially for the winter episodes and for modern buildings with multilayer walls, the heat transfer through walls is not well captured in some cases, leading to discrepancies between the modelled and observed wall-surface temperature. Furthermore, the study corroborates model dependency on the accuracy of the input data. In particular, the temperatures of surfaces affected by nearby trees strongly depend on the spatial distribution of the leaf area density, land surface temperatures at grass surfaces strongly depend on the initial soil moisture, wall-surface temperatures depend on the correct setting of wall material parameters, and concentrations depend on detailed information on spatial distribution of emissions, all of which are

often unavailable at sufficient accuracy. The study also points out some current model limitations, particularly the implications of representing topography and complex heterogeneous facades on a discrete Cartesian grid, and glass facades that are not fully represented in terms of radiative processes. Our findings are able to validate the representation of physical processes in PALM while also pointing out specific shortcomings. This will help to build a baseline for future developments of the model and improvements of simulations of physical processes in an urban environment.
Trvalý link: http://hdl.handle.net/11104/0321583

Vědecká data: Forschungsdaten-Repositorium der LUH
Datasety v Asep:
Validation of the PALM model system 6.0 in real urban environment; case study of Prague-Dejvice, Czech Republic.

0544560 - ÚI 2022 eng J - Článek v odborném periodiku
Kolek, L. - Šisler, V. - Martinková, Patrícia - Brom, C.
Can video games change attitudes towards history?Results from a laboratory experiment measuring short- and long-term effects.
Journal of Computer Assisted Learning. First published: 04 August 2021 (2021). ISSN 0266-4909. E-ISSN 1365-2729
Grant CEP: GA ČR(CZ) GA21-03658S
Institucionální podpora: RVO:67985807
Klíčová slova: differential item functioning * explicit attitudes * game-based learning * history representation * implicit attitudes * media in education * video games
Impakt faktor: 3.862, rok: 2020
DOI: 10.1111/jcal.12575

This study investigates a video game's effects on implicit and explicit attitudes towards depicted historical events in the short- and long-term on a sample of 148 young adults. We used, as an intervention tool, a serious game Czechoslovakia 38–89: Borderlands that deals with the expulsion of the Sudeten Germans from the former Czechoslovakia after the WWII. Results showed more negative pretest-posttest explicit attitude changes towards the expulsion on a general level ($d = -0.34$) and a specific level ($d = -0.53$) compared to the control group. Over the long-term, group differences in attitude change remained significant for the specific level ($d = -0.44$), but not for general one ($d = -0.16$). Exploratory analysis on the item level indicated that especially attitudes towards the expulsion's (un)fairness were affected by the game. However, no significant changes were found in implicit attitudes in the experimental group. This study is the first of such scale to empirically investigate video games' effects on a society's historical awareness.
Trvalý link: http://hdl.handle.net/11104/0321405