

Board of Biometrics

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List of Abstracts

Katarzyna Ambroży, Iwona Mejza: A note on efficiency of some non-orthogonal split-block-plot design with control treatments

Many split-block-plot (SBP) experiments used in agriculture are designed to study new crop plant cultivars. A problem of the comparison of the new treatments with the control treatments is usually very important in these experiments. It happens also that experimental material is limited and does not allow to use a complete design. Such experiments may then be laid down in an incomplete (non-orthogonal) design for three factor experiments. One case of a construction of the incomplete SBP design with respect to the levels of the factor B and C is considered. The A treatments are arranged as in a complete SBP design. The B and C treatments consist of two groups: the set of the test treatments and the set of the control treatments. The major aim of such experiments is the comparison of both the sets of treatments and treatment comparisons within sets. A numerical example is presented to illustrate the method of the construction and statistical properties of the final design.

Anna Bartkowiak: Novelty detection in biometrical data

The problem of outliers is as old as data analysis itself. Data sets encountered in practice are usually considered as containing data vectors ('data points') sampled from a population under investigation. The sample may contain 'typical' and 'atypical' data vectors. There exists an enormous research how to detect which data point may be considered as 'normal' and which as 'abnormal'. What means that a data point is abnormal? Is this simply an erroneous recording, a casual abnormality, which should be down-weighted when building a mathematical model of the data? Sometimes it happens, that the found outlying points may be the most interesting thing of the data, because they may be the sign of a change of the population, in developing e.g. a new species, or a new behavior or a new status. Then the outliers constitute in fact the target of our analysis. May talk will be about building multivariate decision boundaries permitting to distinguish between the normal and the novel (abnormal) items.

Carlos A. Coelho, Joao T. Mexia: The Distribution of the Test Statistic for Testing the Equality of two Generalized Variances in the Non-central Linear Case – An Example of Application of the results on the Distribution of the Product of Independent Gamma-Ratio Random Variables

In this presentation we will study in detail the exact distribution of the likelihood ratio test statistic for testing the equality of two generalized variances in the non-central linear case and will also consider in detail some near-exact distributions for this same statistic. The results obtained are based on the recent book "Product and Ratio of Generalized Gamma-Ratio Random Variables: Exact and Near-exact Distributions - Applications" by the same authors. Simulations and numerical studies are used to show the usefulness of the near-exact distributions in handling so complicated distributions, as well as the sharp closeness of such distributions to the exact distribution.

Lucie Doudová, Libor Žák, Eva Weiserová, František Buňka, Jaroslav Michálek: Fuzzy a regresní přístup k odhadu změn konzistence sýrů ovlivněnou záměnou směsí tavicích solí

Cílem příspěvku je odhadnout poměrovou (procentuální) změnu vybraných konzistenčních parametrů tavených sýrů způsobenou záměnou v binární směsi fosforečnanů (změna konkrétního fosforečnanu, resp. jejich poměrů) na datovém souboru, který byl získán měřením konzistence taveného sýru po třiceti dnech jeho skladování. Pro binární směsi byly vybrány fosforečnany, které se podle Guinee et al. (2004) často pro výrobu tavených sýrů používají: Na_2HPO_4 ; $\text{Na}_4\text{P}_2\text{O}_7$; $\text{Na}_5\text{P}_3\text{O}_{10}$; and sodium salt of polyphosphate). Statistická analýza je provedena dvěma způsoby: 1. Pomocí regresní analýzy byly nalezeny odhady parametrů konzistence v závislosti na poměru složek dvou vybraných solí. Následně pomocí inverzí transformace byl nalezen odhad poměru, který odpovídá vybranému parametru konzistence pro jinou dvojici solí. 2. Druhý způsob byl založen na fuzzy přístupu k analyzovanému statistickému souboru. Odladěním fuzzy inference systému na datech se získala závislost síly na poměru složek. Závislost je popsána ve formě pravidel fuzzy inference systému s příslušnými fuzzy množinami. Tuto závislost je možné reprezentovat ve tvaru křivky v rovině.

V závěru práce jsou oba přístupy porovnány a ukázány přednosti a nedostatky obou způsobů statistického vyhodnocení.

Karel Drápela: Kalibrace smíšeného regresního modelu na příkladu výškové funkce v lesnictví

The article describes the utilization of mixed regression models for modelling of hierarchical data sets. The main advantage of mixed model is calibration i.e. the estimation of random parameters of the model based only on a small number of measured data points of the response. Calibration is demonstrated on the example of height function (a relationship between height and diameter of trees measured in a forest stand). The suitable number of height measurements and their sample design are discussed. 3-5 measurements of height regularly spaced within a range of diameters were evaluated as the best possibility.

Jaromír Ducháček, Luděk Stádník, Jan Beran, Monika Okrouhlá, Luboš Vostrý: Modelování obsahu kyseliny citronové a somatických buněk v mléce v první fázi laktace u holštýnských dojnic

The aim of this study was statistical evaluation of the fluctuations of citric acid and the number of somatic cells in milk during the first four months of lactation. For this experiment was selected 27 Holstein cows with different milk yields and lactation order. For the evaluation have been developed model, in which entering the following effects: the milk components, condition, order of lactation, milk yield on days of lactation, regression on days of lactation, quadratic regression on days of lactation, the citric acid content and number of somatic cells. Two variants of calculation were designed. The first calculation was evaluated by the citric acid. The second calculation was designed for number of somatic cells. SAS 9.1. and there method GLM have been used as a basic modeling program and method.

Ana Sousa Ferreira: Classification of psychological data by a combining models approach

In the context of Discrete Discrete Discriminant Analysis (DDA) we have, frequently, several classification rules in competition for the same problem and one of those rules is selected, based on some criteria. Acting in such a way, leads to reject several models for which the parameters have been estimated. The idea of combining models is currently emerging in an increasing number of papers, with a view to obtaining a more robust and stable model than any of the competing models. This seems to be a promising approach since it is known that different DDA models perform differently on different subjects. In bi-class problems we proposed a classification rule based on a single coefficient, (0 1), producing an intermediate model between the Full Multinomial model (FMM) model and the First-Order Independence Model (FOIM) (Brito et al. (2006)). In the multiclass case our approach consists in decomposing the multiclass problem in several bi-class problems embedded in a binary tree - the Hierarchical Coupling Model (HIERM). The affinity coefficient (Matusita (1955); Bacelar-Nicolau (1985)) is proposed for the choice of the hierarchical couples, at each level of the tree, among all possible forms of merging. At each level of the tree, the classification rule is derived using a combining model for the bi-class problem. In the present work we apply this approach to psychological data concerning "Alexithymia" (Prazeres (1996); Sousa Ferreira (2009)). We specifically focus on the performance of the models' combinations assessing the error rate by half-sampling.

David Hampel: Přínos GLIM pro analýzu binomických dat v odrůdovém zkušebnictví

Binomická data se v odrůdovém zkušebnictví objevují zejména v pokusech testujících mrazuvzdornost a ve fytopatologických experimentech. Obvykle používané metody hodnocení těchto dat často nerespektují jejich podstatu a proto zůstává značná část získané informace nevyužita. Zobecněný lineární model, jehož použití zde ověřujeme, se jeví jako vhodný prostředek analýzy.

Jiří Hartmann: Užití GLIM pro analýzu subjektivně hodnocených znaků

Objektivní měření – délkovými měřidly, váhami atd. – není z různých důvodů vždy možné provádět, ačkoliv by to zkoumaný objekt umožňoval. V takovém případě se přistupuje k ohodnocování objektů úrovněmi ordinální škály. Při hodnocení takovýchto dat vyvstává řada problémů, použití zobecněného lineárního modelu některé z nich odbourává.

Šárka Hanzelková, Aneta Bubeníčková, David Hampel: Souvislost instrumentálního hodnocení barvy a textury kyselých sýrů zrajících pod mazem s délkou zrání

Sour curd smeared cheese was ripened for 35 days and the ripening time was assessed as a factor of development of the color and the texture of cheese. Objective measurement of color was provided using a spectrophotometer Konica Minolta CM 3500d, hardness was measured using shear device Tira test 27025 (ball penetration probe). Analysis of variance at 5% significance level showed that both color and texture were influenced by the ripening time. The texture improved at the end of shelf life of the cheese, hardness decreased by 55 % of initial value. The most valuable parameter of color was the lightness, which decreased significantly ($p < 0.001$) during ripening. The hue considerably changed and was unified in matured cheese. Lightness and hue highly negatively correlated (cut $-0,7301$, surface $-0,8502$, $p < 0.001$). There was interesting positive correlation between hardness and lightness (cut $0,8447$, surface $0,8606$, $p < 0.001$).

Zuzana Hübnerová: Vliv odhadu rušivého parametru tvaru na testy v modelech s negativně binomickým rozdělením

Negative binomial distribution can be parametrized with an expected value and a shape parameter. When testing an equality of random variables with the negative binomial distribution in one-way ANOVA type models, the shape parameter is a nuisance parameter. The paper focuses on these tests under assumption that the value of the shape parameter is equal and constant for all random variables. Nevertheless, in those cases the known value of the shape parameter is often replaced by its estimate. The paper considers possible consequences of the above described procedure.

Pavla Hošková, Jiří Mach: Analýza přírůstku javoru klen v závislosti na úrovni hnojení

At the level of operational cultivation of ornamental woody plants is need to estimate, what quantity of fertilizers will lead to the best values of their qualitative parameters. That is why a field experiment with seedlings of sycamore maples was found with different doses of slowly soluble fertilizer. At seedlings was monitored the height of plants, the total size of increase and the thickness of root collar. Measured data was consequently evaluated by the help of analysis of variance, which targets to findings of statistically significant difference among averages. According to its results was then derived optimum dose of fertilizers, which - regarding to the biggest increase - is about 178 kg/ha, Chat is 25 kg of net nitrogen on hectare, when plants reached the biggest average heights.

Veronika Jadczková: Multivariate statistical methods in lifestyle research

The work is concerned with market segmentation in terms of consumer lifestyle, values, attitudes and demographics. First and foremost, theoretical background attempts at outline of prevailing conceptual issues in psychographic research. Next, methodological section describes sequence of steps to be pursued when conducting a marketing research and last but not least, provides a theoretical treatment of techniques assessing variability between data. Final chapters demonstrate the practical use of psychographic information by means of relevant multivariate statistical methods, its organization within positioning maps, targeting and possible projection into advertising message.

Zdeněk Karpíšek: Fuzzy množiny ve statistice

Přehledový příspěvek je zaměřen na výklad základních pojmů a operací s fuzzy množinami a fuzzy čísly, možnosti fuzzifikace statistického souboru a jeho charakteristik, úvod do fuzzy pravděpodobnosti a fuzzy náhodných veličin. Jeho součástí je také seznámení s vybranými aplikacemi fuzzy stochastických modelů.

Dariusz Kayzer, Krzysztof Szoszkiewicz: Positions of selected plant communities differentiated with respect to the environmental variables in the space of canonical variates.

Analysis based of results of river survey carried out in UK and Northern Ireland in the period 1995-2001 where 288 relevs were described. Field assessment was undertaken according to phytosociological method by Braun-Blanquet approach. Common types of plant communities were analysed, which were classified as 12 phytosociological associations. These represent a wide ecological range. The environmental requirements were classified basing on the 10 variables, which reflect different kinds of geographical conditions as geographical, landscape, geology, land use of the watershed and water quality. The aim of the study was presenting usefulness of canonical variate analysis for estimating environmental requirements of plant communities. The position of different vegetation types were shown in the space of canonical variates.

Katarzyna Kaźmierczak, Bogna Zawieja: The effect of meteorological conditions on growth of the main shoot and lateral branches of scots pine (*Pinus sylvestris*)

Scots pine (*Pinus sylvestris* L.) is an important tree species in commercial forests of Poland. Due to its high tolerance to different soil and climatic conditions it is grown throughout the country. Many authors investigate the effect of climatic conditions on radial increments in pine. However, tree development is considerably affected by the volume and quality of the crown, thus it was decided to analyse in this study the effect of atmospheric conditions on increments in height and those of lateral branches of 25-year old trees in a 5-year period. For this purpose linear correlation and square regression were calculated for the dependence of increments on temperature and precipitation recorded in a given increment year. Those results show that weather conditions observed in July have a significant effect on crown development (particularly on lateral branches).

Pavla Krajčková: Simulační studie metod pro posouzení účinnosti léčby

Jedním z cílů meta-analýzy klinických studií je zjištění účinnosti nového typu léčby. Tato účinnost je posuzována pomocí rozdílů v účinnosti nové léčby a účinnosti standardní léčby. K měření rozdílů účinností se v případě binárních dat nejčastěji používá podílů šancí, méně často pak rozdílů pravděpodobností. Častým případem z praxe je vedení nezávislých pokusů ve vícero zdravotnických zařízeních. Jedním z postupů použitelných pro danou situaci je využití intervalu spolehlivosti pro rozdíl společných efektů nové a standardní léčby, při jehož konstrukci je využit postup navržený v práci Wimmer & Witkovský (2004) založený na metodě z práce Kenward & Roger (1997). Další možností je postup založený na zobecněném lineárním modelu se smíšenými efekty uvedený v Whitehead (2002). Simulační studie, jíž se příspěvek zabývá, studuje základní vlastnosti výše uvedených postupů v různých simulovaných situacích.

Tadeusz Łuczkiwicz, Jan Bocianowski, Jerzy Nawracała, Karolina Satkiewicz: Influence of genetic distance between parental genotypes of *Camelina sativa* L. on SCA effects in their hybrids

Gold of pleasure (*Camelina sativa* L.) is one of the oilseed crops cultivated in Europe since the Bronze Age at present practically forgotten. Camelina is low input oilseed crop with potential for food and not food utilization. Gold of pleasure yield can be compare with spring rape yield. Winter Camelina forms can give more than 20 q/ha seeds yield, spring forms about 30% less.

Objective of the present study was to determine some breeding characteristics (SCA effects) in spring form of gold of pleasure and relationship between Mahalanobis distance between parental lines and effects of SCA in their F1 hybrids. In this paper we are looking for the best curve describing the relationship between Mahalanobis distance of parental lines (taking into account 18 traits) and the effects of SCA for 1000 - seeds weight. Such information would help in planning comprehensive breeding program aimed to improve seed yield and oil content in *Camelina sativa* L.

Joao T. Mexia: COBS (Commutative Orthogonal Block Structure): Segregation and Matching, Crossing and Nesting

The algebraic structure of models with COBS is studied. BLUE for estimable vectors are obtained. Conditions, matching an segregation for estimation of variance components are discussed. Binary operations, crossing and nesting are considered, namely when we cross two models we obtain a new model whose treatments are all the combinations of the treatments in the initial models. Nesting models we nest all treatments of a model inside each treatment of the other.

Jaroslav Michálek, Michal Šmerek, Jaroslav Michálek ml.: Optimální kombinace variant genů typické pro dětské pacienty se septickými stavů

This paper deals with the research of genes variants structure in the group of child patients and in the group of healthy people. The aim of the article is to find statistically significant differences in the structure of both studied groups. Some partial results have already been obtained and published. In publications [1, 2, 3] there were described differences between both groups which are dependent on one studied gene. The theory of graphical models was used in order to describe statistical structure of genes variants, [5, 6]. At last, an optimal model for the description of these structures in each group was found with the help of hierarchical models, [4]. The synthesis of all previous procedures is mentioned in this article. Thanks to the use of probit and logit analysis genes variant combinations typical for each of studied groups were found. These found combinations correspond very well to the results of graphical models analyses. Obtained results are in accord with genes analyses of patients who did not survive their serious septic state.

Ivo Moll: Kalibrace podobných objektů

The paper begins by defining the calibration of similar objects in a space of arbitrary dimension. The calibration of similar objects is a natural generalization of the calibration of identical objects. The paper derives an estimate of the unknown parameters of a model of two-dimensional linear calibration of non-specified similar objects with a known covariance matrix. The theoretical results are illustrated by the final numerical demonstrations.

Kateřina Myšková: Lineární kalibrace pravidelných n-úhelníků

Linear calibration of regular polygons is a special case of the linear calibration of specified identical objects. The paper is based on the coordinates measured of the vertices of both polygons. These data are expected to have a bivariate Gauss distribution with known covariance matrices. The paper derives an estimate of the parameters of a linear calibration function and of the vertices of regular polygons. The results are demonstrated by examples.

Teresa A. Oliveira, Amílcar Oliveira: On exploring BIBD and PBIBD links to Maths

In Statistics and Experimental Design it is very well known that Balanced and Partially Balanced Incomplete Block Designs (BIBD and PBIBD) play a key role. In addition to their optimal properties and to the possible applications in various areas of science, these plans present extremely relevant links, highlighted in Pure and Applied Mathematics. We explore and illustrate with examples some of these links, privileging the branches of Algebra, Geometry, Combinatorial analysis, Graph Theory and Optimization. Some ideas for future research using R will be presented.

Jan Orava: Kernel density estimation, choice of neighbour order

Consider k-nearest neighbour kernel density estimate. There was published the large number of articles about asymptotic properties of kNN kernel density estimate. Nevertheless we will be more interested in practice use of this method, how to choose the order k and if this choice is acceptable. In the article, there are presented two methods based up on smoothing parameter methods for global kernel density estimator, cross-validation maximal likelihood method and least square cross-validation method. Both methods were compared in simulation study.

Milan Palát Sr., Zdeněk Bauer, Milan Palát Jr.: Modelling the effect of climate on life activities of bird populations

Three localities were studied in the Morava River profile, namely Soutok (altitude 152 m), Horka (altitude 220 m) and Horní Morava (altitude 746 m). Four bird species are evaluated in the paper in the period 1951-2000, viz. *Sitta europaea*, *Parus major*, *Parus coeruleus* and *Muscicapa albicollis*. The course of nesting shifts with increasing altitude up the river to later date. Particular bird species require the different sum of effective temperatures to enter their reproduction process. Data of the first laid egg and sums of effective temperatures were fitted by means of regression functions and confidence intervals were determined for particular decades. With increasing altitude, the sum of effective temperatures remains nearly the same at particular species, however, the date of a relevant phenological phase is changed and the earlier start of a reproduction process of a bird species occurs.

Pilarczyk W., Zawieja B.: On an alternative method of testing of varietal uniformity

An officially adopted by UPOV (International Union for the Protection of New Varieties of Plants) method of testing uniformity of varieties is COYU (combined over-years uniformity), Talbot (2000). In this method the standard deviations (log-transformed and adjusted by moving average method) of new (candidate) varieties are compared with average value of standard deviations of reference-set varieties. In an alternative approach, instead of testing equality of standard deviations, the coefficients of variation of candidate varieties are compared with average coefficient of variation of reference-set varieties, Zawieja and Pilarczyk (2005). In this approach, the Bennett's test is used both for testing equality of coefficients of variation of reference set varieties and for testing uniformity of candidate variety. In a present paper the decisions concerning uniformity of candidate varieties supported by COYU and by Bennett's test are compared with use partly real and partly generated data. In a second method, the Bennett's test for testing uniformity of candidate varieties is replaced by F-test, Forkman (2009).

Václav Pink: Deterministické populační modely a software k identifikaci jejich parametrů

Príspevek se zabývá stručným popisem vybraných modelů růstu jedné nebo dvou populací (typ draveckoříst). Jsou představeny softwarové prostředky (EASYFIT, R language), které lze použít k odhadu parametrů jednotlivých modelů a jejich užití je ukázáno na konkrétních datech.

Zdeněk Pospíšil: Identifikace parametrů deterministických modelů – užití metod kvadratického programování

Deterministic dynamical models represent a tool for a description of a biological system evolution, namely, of a structured population or interacting populations in (agro)-ecosystems ones. Such models contain certain number of parameters. To apply the models, one need to identify or to estimate these parameters from field or experimental data. The contribution presents a modification of least-squares method for parameters estimation which leads to a quadratic programming problem. The method is applied to a succession of seven-spot ladybird population on corn and to a leukaemia-free survival of patients.

Josef Příbyl, Václav Řehout, Jindřich Čítek, Jana Příbylová: Ways of animal evaluation according the large number of SNP in connection with production traits.

Including large number of SNP markers (50K) increase the reliability of evaluation of young animals. The evaluation is usually in two steps. In the first step the BLUP procedures are used for adjustment of non-genetic systematic effects. In the second step the pseudo-data with high reliability, like daughter-yield-deviations, are used as inputs. Evaluation is by BLUP-AM with random effects of remaining polygenes, with relationship matrix between animals (A), and effects of particular markers. Genomic breeding value (GEBV) is then combination of polygenic and marker's parts. Information about genetic markers can be gathered in realised genomic relationship matrix (G). Similar result of GEBV is then achieved by using in second step only effect of animal, without genetic markers, and substituting G for A. In real population has two step procedure disadvantages, because it is difficult compare genotyped and ungenotyped animals, and second step needs input parameters known without errors. Therefore one-step procedure is used, which evaluates both genotyped and ungenotyped animals at the same run, and produces one common ranking of all animals in a whole population. Principal part of one-step procedure is augmented pedigree-genomic relationship matrix. This procedure allows large variety of mathematical models and evaluation on national scale.

Petr Šafus: Metody hodnocení plodnosti skotu

This paper describes some methods, which were used for fertility evaluation in cattle breeding. Therefore were described differences in evaluation by means of interval and means of discrete measures. BLUP AM method was defined as main method of fertility evaluation for measures with normal distribution. As important problem was mentioned censored data.

Stergios Tzortzios: A study of the biometric and computer applications in agricultural education and research – a Greek case study

It is well known that the knowledge and use of advanced biometrical and computer applications give an impulse to the improvement and quality of agricultural education and research. Especially the use of modern biometric and computer methods in the statistical analysis of agricultural research data is considered to be essential for the validity and creditability of the arising research results as it gives new perspectives in experimental data analysis. In most of the times the analysis of agricultural research data is accomplished via standard statistical methods. This is because of the lack of knowledge of biometrical and computer developments in data analysis by the scientists working in the wider field of agricultural education and research. Regarding the abovementioned situation it is obvious the need to record the present status of the usage and knowledge of up-to-date statistical data analysis and computer methods in agricultural education and research.

This paper, carried out through a bilateral research project between two European countries under the support of the Greek GSRT, presents an attempt to analyze and evaluate the usual statistical analysis methods that are implemented by the educators and researchers in Greece regarding their particular sub fields in agriculture.

The study was realized by using the method of close answers questionnaire referred to special topics in the process of data analysis such as data management, use of computers-software, methods for statistical processing and experimental designs. Analyzing the gathered data it was obtained summary reports and conclusions regarding the advantages and disadvantages of the preferred used biometrical and computers methods by the involved scientific institutions. This gives the possibility of making proposals for the effectiveness and quality of agricultural education and research through the practise of modern educative and research methodologies.

Zdeňka Veselá, Luboš Vostrý, Petr Šafus: Lineární a prahový model pro odhad genetických parametrů pro hodnocení jatečně upravených těl masného skotu metodou SEUROP

The objective of this study was to estimate genetic parameters for the results of classifying of carcass traits by the SEUROP method in beef cattle in the Czech Republic using linear and linear-threshold model. Genetic parameters were estimated by multi-trait animal model using a linear model and a linear-threshold model in which carcass weight (CW) was considered as linear trait and carcass conformation (CC) and carcass fatness (CF) as threshold traits. Heritability coefficient for CW differed only slightly according to the method estimation (0.295 in linear model and 0.306 in linear-threshold model). Heritability coefficient for CC was 0.187 and 0.237. Heritability coefficient for CF grading was 0.089 and 0.146. Genetic correlation between CW and CC was high (0.823 and 0.959), the correlation between CW and CF was intermediate (0.332 and 0.328) and it was low between CF and CC (0.071 and 0.053).

Michaela Vojtová: Poznámka k deterministickým modelom dynamiky populácií

In this talk we study sufficient conditions on Lotka–Volterra systems

$$\dot{x}_j = \varepsilon_j x_j + \sum_{k=1}^n a_{jk} x_j x_k \quad \text{for } j = 1, \dots, n \quad (1)$$

to admit conservation law and we discuss aspects of the Hamiltonian structure of systems of type 1. We show that for stable dissipative Lotka–Volterra systems with a singular point $\mathbf{q} \in \text{Int}(\mathbb{R}_+^n)$ the dynamics on the attractor are hamiltonian.

Luboš Vostrý, Josef Příbyl, Zdeňka Veselá, Petr Šimeček: Výběr vlastností pro genetické hodnocení lineárního popisu u starokladrubského koně

The objective of this article was selection of method for reduction the number of described traits from the original 36 to 24, the traits were selected according to: measure of genetic similarity (cluster analysis), measure of uncertainty multidimensional quantity, value of the variance of aggregate genotype, value of the variance of selection index and correlation of trait to the first principal component of the genetics matrix. The estimation of selection index variance which omitted traits with low heritability coefficient and high genetic correlation was the most suitable for the selection of important traits.

Martin Vozár: Diferenciálne rovnice v MATLABe

The article deals with differential equations using MATLAB software, which includes built-in solvers to tackle them. In the beginning we mention a simple overview of differential equations. Furthermore, we attend to numerical solution of differential equations, and remember the fundamental ways of addressing differential equations. Finally, we present an example of solutions of differential equations using MATLAB built-in solver.

Hana Vydrová, Luboš Vostrý, Barbora Hofmanová, Julie Poláčková: Analýzy výskytu melanomu u plemena starokladrubský kůň s využitím logitových modelů

The contribution contains statistical analysis of certain factors with possible impact on occurrence of melanoma in Old Kladruber horse. The considered factors were Sire line, Sex, Age of description, degree of greying, year of description, degree of Vitilligo A and Vitilligo F. The statistical analysis found in most cases significant impact of the considered factors on the occurrence of melanoma in animals Old Kladrub horse. The no significant impact was found by Sex effect on occurrence of melanoma. Logit model was found as suitable for analysis of occurrence of melanoma in Old Kladrube horse express as binomial variable.

Mirosława Wesołowska-Janczarek: A few remarks about the influence of concomitant variables variation on the estimation of polynomial coefficients in some models growth curves

In the paper we are interested in growth curves estimators when other variables beyond the time have influence on changing studied variable values in time. The values of these additional variables can be measured too, and these values can change in successive time points. These additional variables are called concomitant variables. In such models we have two groups of parameters. They are polynomial and regression coefficients. The growth curve with concomitant variables is the method to which problems of polynomial regression with multiple regression are connected. In the paper the review of known models and proper estimation methods is supplemented by a new model for growth curve with concomitant variables, whose values are different for all units and for all time points simultaneously. This model and the proper parameter estimation method was considered under certain assumptions. A choice of the proper model and suitable estimation method ought to be compliant with the problem character and data that are the disposal of the experimenter.

Viktor Witkovský: O niektorých metódach konštrukcie konfidenčných intervalov a oblastí pre parametre lineárneho zmiešaného modelu

V príspevku sa budeme zaoberať metódou konštrukcia konfidenčných oblastí pre parametre modelu založených na funkcii vierohodnosti, resp. funkcii podielu vierohodností. Je to metóda, ktorá je alternatívou k viac tradičnej metóde konštrukcie konfidenčných oblastí tzv. waldovského typu, ktorá vychádza z asymptotickej normality rozdelenia odhadov metódou maximálnej vierohodnosti (MLE).

Cieľom príspevku je ilustrovať konštrukciu približných a exaktných konfidenčných oblastí pre parametre modelu založených na funkcii vierohodnosti v niektorých špeciálnych prípadoch, s poukázaním na možné využitie zovšeobecnených pivotov, resp. fiduciálneho rozdelenia parametrov: i) pre parametre klasického lineárneho regresného modelu, ii) pre variančné komponenty v zmiešanom lineárnom modeli s dvomi variančnými komponentami.

Ivan Žežula: Generalized linear models

Linear models are very popular among biologists. However, many data they meet are far from being continuous and normal. A whole range of generalized linear models suitable for categorical or discrete data have been developed through the last decades. Our paper tries to make an overview of the most useful ones.