Statistické Úsudky – New Textbook on Statistical Induction in Czech Language

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MALÁ, I. *Statistické úsudky* (Statistical Judgments). 1st edition, Prague: Professional Publishing, 2013. ISBN 978-80-7431-127-7.

The book deals successfully with the difficult task to present principles of statistical induction to university students with limited mathematical curriculum. Regarding the prerequisites in probability it consistently refers to the textbook Pravděpodobnost[2] (Probability) by Luboš Marek reviewed in the January 2014 issue of this journal. These books make up a self-contained series of the textbooks for undergraduates to master the principles of mathematical statistics. The reviewed book is intended for anyone with knowledge of the basics of calculus, matrix algebra and fundamental principles of probability and statistics.[3]

It consists of seven chapters, the last chapter includes basic statistical tables and formulae for confidence intervals and tests of hypotheses.

The first chapter introduces basic concepts of the random sample, statistics, distributions of sample statistics and basic limit theorems. The next three chapters make the core of the textbook, they are very adequate, all the derivations and explanations are worked out in detail, many gaps common in standard textbooks are filled in.

The second chapter Principles of Point Estimation Theory provides a very clear exposition to the fundamental properties of point estimators and introduces the main approaches to the construction of the point estimator (moment method, plug-in method using quantiles, maximum likelihood method). The author also includes a multivariate case – estimators of a vector of random parameters.

The next chapter Interval Estimation introduces the concept of interval estimators both for one-sample and two-sample setting. All special cases are carefully worked out in detail to facilitate the understanding of the construction of corresponding confidence intervals.

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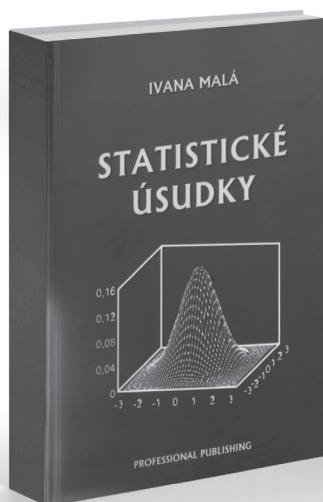
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[2] Marek, L. *Pravděpodobnost* (Probability). 1st edition, Prague: Professional Publishing, 2012, ISBN 978-80-7431-087-4.

[3] For example from well-established introductory textbook by Hindls, R. et al.: Statistika pro ekonomy (Statistics for Economists). 8th edition, Prague: Professional Publishing, 2007, ISBN 978-80-86946-43.6.

The fourth chapter Testing of Hypotheses presents the idea behind the testing of statistical hypotheses. Selected tests of hypotheses in parametric settings are presented and heuristics of their construction are given.

The fifth chapter Distribution of Order Statistics explains the distribution of order statistics, range of a sample, characteristics of variability based on order statistics (median absolute deviation, Gini mean difference among others) and empirical distribution function.

The sixth chapter Selected nonparametric tests differs from the previous chapters, because it provides only basics of the classical nonparametric tests and goodness-of-fit tests. This chapter deserves to be extended in both the scope of the non-parametric tests (for example kernel density estimators) and the motivation, heuristics and derivation of these tests.

The approach of the presentation is well chosen and shows a long-time pedagogical experience in teaching statistical induction to students with limited mathematical background. The author avoids using the traditional structure "definition – theorem – (mostly omitted) proof" that is usually discouraging for students at the intermediate level. Instead, most of the concepts are defined, explained and then the methods and heuristics behind them are derived step-by-step in the text. Many worked out theoretical examples help reader to grasp how to construct the confidence intervals and study theoretical properties of the estimators. Also numerical examples and graphs are provided to learn how to apply these methods and techniques to real data. A very good exercise book for this purpose is Statistika v příkladech[4] (Statistics in Examples), which uses MS Excel as statistical software. MS Excel is a good choice for intermediate students of economic faculties, because it is often required in subjects applying statistics.

The only weak point is that there are not enough theoretical examples. Adding more theoretical examples and also extending the sixth chapter would further improve the quality of the text.

The publication provides a very lucid introduction to statistical induction at the intermediate level for students of economic faculties, professionals in practice or long-distance students. It fills in the existing gap between elementary and advanced (with higher mathematical level) textbooks in the Czech statistical literature. Having said that I can recommend this book, as it represents a progress in this field.

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[4] Marek, L. et al. *Statistika v příkladech* (Statistics in Examples). 1st edition, Prague: Professional Publishing, 2013, ISBN 978-80-7431-118-5.