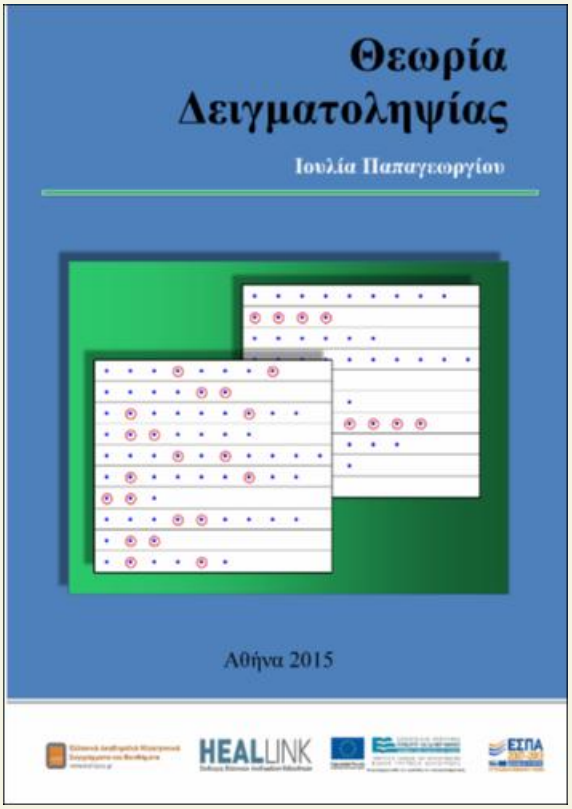

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Abstract

This textbook introduces students to sampling theory. In particular, it examines the sampling techniques used during a sampling survey to collect a statistical sample. Initially, all techniques known from Sampling Theory are studied one by one, such as simple random, stratified, systematic, cluster sampling, and multistage sampling. The main areas of development are the implementation of each sampling technique and statistical inference, i.e., the extraction and extension to the population of results based on a subset of the sample measurements. Statistical inference includes finding estimators for the most important parameters of the population, calculating statistical errors, and constructing confidence intervals. The one-by-one study of the most basic sampling techniques is followed by a comparison between them, mainly in terms of the accuracy of the results. Also, the combination of more than one sampling scheme is studied in the context of multistage sampling. Finally, issues or problems that arise during the implementation of a sample survey and affect the accuracy of its results are studied, such as determining the required sample size and errors due to non-concealment. The sampling methods studied in each chapter include instructions for their implementation with the R statistical package. Commands in R for sample selection and data analysis are also provided. For better understanding, examples with numerical data are provided. The data, as well as instructions for the programs, are added in an appendix at the end of the book.

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