ABSTRACT

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MULTILEVEL MODELS ANALYSIS IN HIERARCHICAL DATA STRUCTURE: AN APPLICATION TO EDUCATIONAL DATA

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Hierarchically structured datasets are very common in real life situations. These types of datasets appear in various areas of statistical analysis, such as Educational Statistics, Spatial Statistics, Health Statistics, Repeated Measures and Survey Research.

In this thesis we focus on Multilevel Models techniques and methods of analysis of hierarchical data, since it is proved that they provide more accurate results compared to more classical approaches. We also apply multilevel statistical analysis to educational data obtained from the Greek Ministry of Education, Lifelong Learning and Religious Affairs referring to the General Admission Grades of students in the National Exams for access to Universities and Technical Institutions for the years 2006 up to 2009. This is the first time multilevel analysis is carried out for data in the particular educational system of access. The results of the analysis show that multilevel models are more effective compared to simple ones, since a 3-level model (students nested in schools and schools in prefectures) is a significant improvement compared to 1-level models. Also, the factors that are detected to have a significant effect on the performance of students are consistent with the results of previous studies. According to the analysis, female students perform better than male students. Also, students examined for the Exact Sciences orientation have the highest performance, while students examined for the Human Sciences orientation, in general, perform slightly better than those of Technical Sciences orientation. However, males for the Technical Sciences orientation perform better than those for the Human Sciences orientation. The best year for students' performance is 2009, while 2006 - first year of application of the new educational system- is by far the worst. Finally, the performance of students from private schools in general is much better than those from public schools. In public schools the performance of students for the Exact Sciences orientation is higher than the "usual pattern".