

THE SIMULATION AND COMPUTATIONAL STATISTICS RESEARCH GROUP

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Since 1989, a group of researchers in the department of Statistics of the University de Barcelona has been working in resampling methods and in simulation, especially in applications of simulation techniques in statistics and statistical methodologies based on simulation, and in the application of these techniques in diverse application fields, mainly biology and health sciences.

Simulation methodology in statistics: The main goal of this research is to improve the quality of simulation studies in statistics by means of variance reduction techniques (VRT), better random variate generators, etc. Ocaña and Ruiz-Rivas (1990) propose an efficient random variate generator for the Cuadras-Augé system of bivariate distributions. Vegas and Ocaña (1992) introduce a VRT especially devoted to improve the precision of simulation studies with dichotomic response variables (i.e. studies of the power of a test or the coverage of a confidence interval). This VRT is developed in Ocaña and Vegas (1995). Vegas (1997) and Vegas and Ocaña (2000) illustrate its application a concrete simulation studies in statistics. Vegas, del Castillo and Ocaña (2000) analyze the properties of this VRT from the perspective of exponential models and differential geometry.

Resampling methods: This research line is devoted to the study of some inferential problems posed by the use of some distance and diversity indices in diverse application fields. These inferential problems are approximated by means of resampling techniques (especially the bootstrap) and involve theoretical and simulation studies. Ribó, Ocaña and Prevosti (1989) and Ocaña, Ruiz de Villa and Ribó (1991) are studies on the Levene's Z index of sexual selection. Sánchez, Ocaña and Utzet (1995) and Sánchez, Ocaña, Utzet and Serra (2001) are studies on Prevosti's distance index, widely used in genetics. Pardo, Morales, Salicrú and Menéndez (1997), Salicrú, Vives and Ocaña (2000) and Vives, Salicrú and Ocaña (2001) are studies on entropy and diversity measures.

Statistical and simulation software: Statisticians are frequently also software developers. For example, a new statistical method should be implemented in order to make it usable, or its properties may be studied by simulation. Object orientation is a way to improve the quality and reusability of (statistical) software. Sánchez, Ocaña and Ruiz de Villa (1992) present an object-oriented software oriented to statistical simulation.

Ocaña and Sánchez (1996) is a reflection on the use of object-oriented methodologies in statistical and simulation software.

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