



Applied Statistics

Contest

Madrid, 7th March 2013

Dear Colleagues,

As this year is the **International Statistics Year**, we would like to promote some activities from the Department of Statistics and Operational Research II (Decision-Making Methods) at the Faculty of Economic and Business Sciences of the Complutense University of Madrid (UCM). The aim being to demonstrate the usefulness and importance of Statistics, we will be holding an international contest involving **projects in which statistical techniques are a crucial key to solving theoretical and practical problems**.

Yours faithfully,

David Casado

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Contest Rules

- (1) **Contestants:** This contest is for both students from public and private, higher education centres and business schools, and for employees from public administrations and companies. Those who claim to be the author or authors should be people who have made a significant contribution to the work carried out. The work can be carried out under the supervision of a professional in the field of Statistics. This professional will be considered the director of the project. Neither professionals nor postgraduates in Statistics can enter this contest.
- (2) **Field:** Projects in any field can be entered (Economics, Business, Marketing Techniques, public Statistics, Psychology, Biology, Physics, Sociology, Engineering, Medicine, Pharmaceuticals etc.) as long as some statistical technique has played a crucial role in the development of the project. The authors are obliged to enter projects that, despite not necessarily being research projects, do have to be original and must not have previously received any awards.



- (3) **Entry:** So as to keep contestants informed, the last entry forms must be received by **31st December 2013**; however, the last date that projects can be received is a month after this date. The entry form is available by [clicking here](#), it must be sent by email to the following address davidcasado@pdi.ucm.es.
- (4) **Last date and delivery:** Projects must be received by **31st January 2014** at the latest. The projects must be sent by email, labelled “Applied Statistics Contest” in the subject box, to the address davidcasado@pdi.ucm.es with copy to moballes@ucm.es. Authors should ensure that they receive confirmation of their entry having been received from the contest organization. Receipt of an entry implies acceptance of the rules of the contest and also implies that the project is the author’s own work.
- (5) **Panel of judges:** The jury will be made up of professionals from different backgrounds: public and private, academic and business. The names of the members of the panel of judges will be made public.
- (6) **Evaluation:** Members of the panel of judges will be sent copies of the projects entered in a noneditable (PDF) format and without the names of the contestants. The following points will be taken into consideration by the judges on evaluating the projects:
 - (a) **Presentation:** ideas must be clearly presented and strictly scientific
 - (b) **Layout:** ordered ideas, clearly laid out
 - (c) **Content:** scientific and pedagogical interest
 - (d) **Data:** existence of simulated or true data (which type is used must be specified)
 - (e) **Additional Material:** applications for mobiles, executable files, web pages
- (7) **Final decision:** once all the projects have been received by the specified date, evaluation by the panel of judges will begin. The final decision, which cannot be appealed against, will be published on the [Department of Statistics and Operational Research II's web page](#), from 31st February 2014 onwards. Contestants will be informed of their marks if they so wish. All contestants will receive a diploma.
- (8) **Award:** The organisers will undertake to divulge and publish the winning projects under their original author’s name. A prize giving ceremony, at which the winners will be invited to give a report on their work, and for which they will be remunerated, will be held.

Rules on Style and Format

- A) **Language:** should be written in Spanish or English
- B) **Length:** including tables, figures and appendices, should be between ten to twenty pages long
- C) **Style and size of font:** Arial style and size 12
- D) **Line spacing:** single
- E) **Margins:** 1.5 cm
- F) **Foot of the page:** should state the page number and the title of the project or a summarized version of it in the centre (see foot of this page)
- G) **Digital file:** the project should be sent in one file which contains the text and any tables or graphs. The file should be editable using one of the following editors *Microsoft Word*, *StarOffice Writer*, *LibreOffice Writer* or *OpenOffice.org Writer*. Two copies of the file should be sent in: one with the author’s name and another (for the evaluation) without the author’s name.
- H) **References:** bibliographical sources referred to in the text should be listed in alphabetic order, and with the following fields: authors, year, title and editorial, journal or URL.



Examples of Lines of Work

Some ideas for possible project content are listed below and in turn can be used as a key to solving problems in other fields. Do you have any other ideas? Can you access a laboratory or is a professor who does have one willing to take up the challenge...?

Economics

- [1] When a regression model is adjusted, only the significant terms are kept in it after the model has been validated.
- [2] Essential information is supplied by statistical studies in marketing, demography, investment, advertising etc.

Numerical Analysis

- [3] When using polynomials of interpolation, consecutive degrees are considered until increasing them within a unit stops producing a significant decrease in the variance.
- [4] For a continuous random variable X , the methods of numerical integration can be applied to estimate the distribution function $F(x) = P(X \leq x)$ from the analytical expression of the density function $f(x)$. Given a probability distribution, simulation exercises can be carried out to compare the quality of different methods when comparing them with the true value of $F(x)$ (if they can be analytically calculated for the chosen distribution).

Error Theory

- [5] Some measurements are repeated N times consecutively (“in series”) and independently.

Mechanics and Mechanical Statistics

- [6] Certain measurements are repeated N times simultaneously (“in parallel”) and independently.
- [7] Where gases are concerned, the distribution of probability of the variable *average speed* of any particle can be studied statistically.
- [8] When particles collide with each other, the distribution of probability of the variable *angle of dispersion* can be studied statistically.