



31 May - 03 June 2016  
at  
ISEG- Lisbon School of Economics  
and Management

If you intend to submit a paper for the ASTIN COLLOQUIUM LISBOA 2016, you need to provide a **Synopsis** (using the template on the next page), complete this **Submission Form** and submit both to [astincolloquium2016@gmail.com](mailto:astincolloquium2016@gmail.com) by **Saturday 7 May 2016**. Synopses and submission forms must be sent as MSWord attachments, please do not supply them in the body of an email. You will be advised of the outcome and, if accepted, your abstract will be uploaded to the website.

## SUBMISSION FORM

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Title of Paper / Presentation / Session to appear in program:

Risk measure preserving Piecewise Linear Approximation of Empirical Distributions

Author/s:

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3.

4.

What will your final submission be? Presentation and Paper  Presentation Only

If selected, what level of knowledge will delegates attending your session require? (please select only) one

No prior knowledge  General industry knowledge assumed  Technical/specific industry knowledge assumed

**Note:** If you are asked to present at ASTIN COLLOQUIUM LISBOA 2016, it will still be necessary for you to register and pay to attend the Colloquium. IAP does not subsidize, discount, pay for, or extend special registration offers for presenters or delegates.

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## ABSTRACT

### RISK MEASURE PRESERVING PIECEWISE LINEAR APPROXIMATION OF EMPIRICAL DISTRIBUTIONS

*Philipp Arbenz and William Guevara-Alarcón*

**Key words:** Empirical distribution, piecewise linear distribution, coherent risk measures, tail value-at-risk, Monte Carlo simulation.

**Purpose of your paper:** An algorithm that approximates an empirical distribution through a piecewise linear one is introduced. The approximation preserves the mean and imposes a uniformly bounded relative error on a space of coherent risk measures.

**Abstract:** Stochastic models used for pricing, reserving, or capital modelling in insurance companies are often very complex, which is why resulting distributions are typically approximated by Monte Carlo simulations. Both the market and regulators exert increasing pressure not to discard the resulting sample distributions, but rather to store them for future review, audit, or validation, as well as to transfer them between actuarial systems. The present work introduces a compression algorithm which approximates an empirical univariate distribution function through a piecewise linear distribution. In contrast to keeping the full sample, such an approximation facilitates the storage and data transfer of the results by drastically reducing memory requirements. The approximation algorithm preserves the mean and imposes a uniformly bounded relative error over a space of coherent risk measures, such as tail value-at-risk. An efficient, open source implementation is provided.

**Note:** If you are not presenting a paper for this Colloquium, please include as much detail as possible in your Abstract (maximum three pages) to enable delegates to prepare for your session.

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