

Please find below a short abstract of my doctoral dissertation which whose Rigorosum will be next

**Friday May 11th at 11.00 in HSB 6.**

My best regards,

**Diego Andres Alvarez**

## **Infinite random sets and applications in uncertainty analysis by Diego Andrés Alvarez Marín**

Supervisor:  
ao. Univ.-Prof. Dr. Michael Oberguggenberger

Abstract

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In this thesis, a generalization of (Dempster-Shafer) evidence theory using an infinite number of focal elements is done. In particular, we define and study a type of random sets, that we call "of indexable type", which allows the natural modeling of cumulative distribution functions, probability boxes, possibility distributions or families of intervals provided by experts. This makes the method very suitable for uncertainty analyses with parameter uncertainty, providing in this way bounds on the probability of occurrence of events.

Issues like convergence, dependence, discretization and approximation of basic variables, as well as the extension and application to sensitivity analysis of a measure of epistemic uncertainty called "nonspecificity" was performed. It is shown in particular that, the evaluation of the belief and plausibility by means of the evidence theory is simply the approximation by means of Riemann-Stieltjes sums of the Lebesgue-Stieltjes integrals of the belief and plausibility employed when using infinite random sets of indexable type. The results shown discourage the future use of evidence theory in uncertainty analysis and suggests the techniques developed in the thesis, not only because they inherit all nice properties of evidence theory, but also because they remove several strong drawbacks that evidence theory has.

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Diego Andrés ALVAREZ-MARIN  
Doctoral Student

Institut für Grundlagen der Bauingenieurwissenschaften  
Arbeitsbereich für Technische Mathematik (<http://techmath.uibk.ac.at/>)  
Leopold-Franzens Universität Innsbruck  
Technikerstrasse 13  
A-6020 Innsbruck  
Austria, EU

Tel: +43+(0)512-507-6825  
Fax: +43+(0)512-507-2941  
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