
Book of Abstracts

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Wiener processes, resulting in intact marginal distributions for $X_t^{(i)}$ -s. We suggest to create the stochastic correlation ρ_t either by functional dependence on the increments of the factor, or by a Jacobi process driven by the factor. In either way the joint distribution of $W_t^{(i)}$ -s at fixed time t ceases to be multidimensional Gaussian, furthermore formal tests reject the created copula to belong to known copula families. Stochastic correlation proves to be flexible in creating great variety of tail dependence, and is transparently controllable by a couple of parameters. The construction naturally extends to subordinated Brownian motions, and the extension can be given for α -stable processes as well.

Speaker: Mehrmann, Volker (Technical University Berlin, mehrmann@math.tu-berlin.de)
Co-author(s): -

Title: Industrial Mathematics: Modeling, simulation and control of real world processes
Abstract: The use of mathematical methodologies, in particular Modeling, Simulation, and Optimization (MSO) techniques, is an essential factor in modern industrial processes. As an example, automated modeling of dynamical systems with multiphysical components has reached a very high level of maturity. Such equation based modeling packages allow to couple different physical system models together in a very convenient way. Unfortunately the resulting systems of equations are not always well suited for analysis, numerical simulation, control or optimization. As a consequence, typically a mathematically oriented remodeling or regularization step has to be carried out, to reformulate the equations for the use in simulation, optimization and control tools. We present a remodeling concept that creates from a given automatically generated model (including over- and under-determined as well as control systems) a new system which has the same solution set, but which is provably well suited for simulation, control and optimization, and where all the variables keep their physical meaning. We demonstrate the results with several industrial examples and also present many of the current challenges.

Speaker: Mihálykó, Csaba (Pannon Egyetem, Matematika Tanszék, Veszprém, mihalyko@almos.uni-pannon.hu)

Co-author(s): Mihálykóné Orbán Éva, Györfi-Bátori András

Title: On a Discrete Sparre Andersen Risk Model with General Premium Rate

Abstract: The Sparre Andersen Risk Model is often investigated in insurance mathematics. It is used for modelling the operation of insurance companies. Important questions to study are the probability and expected time of ruin in the function of the initial capital. In the literature, usually accepted tool for this purpose is the so called Gerber Shiu discounted penalty function. Integral equations are set up for it in that case when the inter-claim times and claim amounts are characterized by continuous random variables [1].

The practical problems are rather discrete than continuous and the results for the discrete Sparre Andersen risk models are simpler to understand than their continuous analogues. Nevertheless, the discrete models have not attracted much attention and the literature counts fewer contribution. Moreover, the investigated models deal with unit premium rate and multiple claim amounts [2,3].

In this presentation we investigate a discrete Sparre Andersen model in the case of dependent inter-claim times and claim amounts and general premium rate. We define an auxiliary function which corresponds to the Gerber-Shiu discounted penalty function. We set up the difference equation satisfied by it, and we analyze this equation. We investigate the existence and uniqueness of its solution and the limit of the solution as well. In some special cases we provide explicit form of the solution and we investigate the effects of the parameters concerning of the insurance company.

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References

- [1] Albrecher, Hansjörg, et al. 'An algebraic operator approach to the analysis of Gerber-Shiu functions.' Insurance: Mathematics and Economics 46.1 (2010): 42-51.
- [2] Li, Shuanming, Yi Lu, and José Garrido. 'A review of discrete-time risk models.' RACSAM-Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas 103.2 (2009): 321-337.
- [3] Mihálykó, Éva Orbán, and Csaba Mihálykó. 'Discrete Models for intermediate storages under stochastic

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		F terem		G terem		VIP terem		
9:00	Regisztráció							
9:30	Megnyitó							
9:40	Varga S. Richard Kent State University <i>My experiences with the Riemann Hypothesis</i>							
10:05	Volker Mehrmann TU Berlin, EU-MATHS-IN <i>Industrial Mathematics: Modeling, simulation and control of real world processes</i>							
10:50	Szünet							
11:05	Minisimpózium	Minisimpózium: Ipari matematikai sikertörténetek és hálózatok						
11:15		Vaderna Péter Ericsson <i>Applying Machine Learning Methods in Telecommunications</i>						
11:40		Daróczy Bálint MTA SZTAKI						
12:05		Emilio Carrizosa math-in, University of Seville <i>Spanish Network for Mathematics in Industry (math-in)</i>						
12:50	Ebédszünet							
14:00	Hálózatok, Telekommunikáció és Web-Technológiák Bíró József (BME VIK) <i>Geometry of Complex Navigable Networks</i>							
14:45	Szünet							
14:50	Járműgár	Péni Tamás (MTA SZTAKI) <i>Analysis and control of large-scale LPV systems</i>		Telekommunikáció	Csirmaz László (CEU/DE) <i>Megintételek és kétféleké kommunikáció és kriptográfia</i>	Biológia	Hetényi Csaba (ELTE) <i>Answers to current challenges in target-based drug design</i>	
15:35	Szünet							
15:45	Járműgár	Kovács András (MTA SZTAKI) <i>Energy management and optimization in intelligent public lighting</i>		Telekommunikáció	Husztai Andrea (DE) <i>Bilinear Pairing-based Hybrid Mixnet with Anonymous Revocation</i>		Biológia	Hajdú András (DE)
16:10		Mihálykóné Orbán Éva (PE) <i>A new paired comparison method applied for FMEA and other fields</i>			Horváth Géza (DE) <i>Block Cyber Based on Finite Automata Network</i>			Csendes Tibor (SZTE) <i>Optimization and simulation for the design of plasmonic sensor structures</i>
16:35		Takács Gábor (SZE) <i>Predicting Flight Arrival Times with a Multistage Model</i>			Balázs István (SZTE) <i>Optimization of data transfer rate in networks by differential equations with que</i>			Gyöngy Miklós (PPKE) <i>Superresolution ultrasound imaging based on regular discrete scatterers of anisot</i>
17:00		Sleisz Ádám (BME) <i>Charting models of complex supply orders on European power exchanges</i>			Csáji Balázs Csánád (MTA SZTAKI) <i>Exact Confidence Regions for Dynamical Systems</i>			Csikász-Nagy Attila (PPKE) <i>Mathematical modelling in systems biology</i>
17:25	Szünet							
17:40	Hálózatok, Telekommunikáció és Web-Technológiák Benczúr András (MTA SZTAKI) <i>Machine learning in data streams and batch</i>							
18:25	Kerekasztal Az alkalmazott matematika helye a multidiszciplináris kutatásban, fejlesztésben és innovációban.							

Bodó Ágnes (ELTE)
SIS epidemic propagation on hypergraphs

Erőstyk János (SZTE)
Simulating Ebola: Agent-based modeling with indirect disease transmission

Lovász Attila (BME)
Numerical reconstruction of pulsatile blood flow from ECG-gated respiratory tomography data

Ferczel György (PPKE)
Simulation of self-exciting point processes modeling EEG data of epileptic patients

Szabó-Varga Gabriella (MTA SZTAKI)
Performance analysis of vehicle platoons considering inter-vehicle communication delays

Varga László (ELTE)
A simple generalization of the black bootstrap and its application for signal tests