| PhD student | Doctoral Dissertation title | Supervisor | Advisory Committee | Abstract |
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| Alexandros Papadopoulos | Approximations for weighted convolution series | K. Politis | M. Koutras M. Boutsikas | In various areas of applied probability, we encounter (weighted) sums of convolutions of probability distribution functions, often with an infinite number of summands. Two standard examples are the (generalized) renewal function and compound distributions. In general, such series arise in stochastic models that involve sums of random variables, and form a key ingredient in the analysis of such models. Some areas of application include queuing theory, various functions of interest in reliability theory, stochastic models in general insurance and the collective risk model in actuarial science, etc. The approach that will be followed in the proposed research is the use of tools from functional analysis (e.g. Banach spaces and Banach algebras) for new approximation formulae, of a functional form, when there is no analytic expression for a quantity of interest. The method will be applied first in renewal processes (ordinary, mixed or non-homogeneous) and subsequently its application in collective risk theory will be examined. |
| Fountoukidis konstantinos | Contribution to process monitoring using control charts. | Antzoulakos Demetrios | Markos Koutras Athanasios Rakitzis | The subject of the Doctoral Thesis is the construction and study of control chats for the simultaneous monitoring of the mean and the standard deviation of a production process. The theory of runs and patterns will be applied to these control charts in which a unique statistic will be charted. |
| Elena Bamicha | Exploring the role of biomarkers, biomeasures, health related variables and socio-demographic | Georgia Verropoulou | Haralambos Evangelaras Georgios Tzavelas | The study of quality of life among individuals aged 50 years and older, a concept interrelated with a person's physical and mental health, is of particular interest as the elderly people |

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| | factors in quality of life (QoL) among persons aged 50+ in Greece and Europe | | | are more likely to experience adverse events and situations that could threaten both their autonomy and everyday life. The purpose of this research is to investigate the relationship between quality of life of elderly people and factors such as biomarkers, biomeasures, health related variables as well as certain socio-demographic factors through use of appropriate methods of statistical analysis (descriptive statistics, correlations, binary and multinomial logistic regression etc.) aiming, inter alias, not only at assessing the needs of people who are 50 years or more but also in improving the provided services and policies. Hence, our analysis is based on data of the sixth wave of SHARE, the Survey of Health, Aging and Retirement in Europe. Last but not least, it is important to note that our data are quite recent since biomarkers comprise an innovation of the sixth wave. |
| Lazaros Kanellopoulos | Applications of stochastic orders in collective risk theory | K. Politis | | Ordering of risks is one of the problems with primary interest, both in actuarial science in general but more specifically in collective risk theory. Mathematically, the theory of stochastic orders serves as the main vehicle for making comparisons between risks, both at an individual and at a collective level. In the last few decades, a number of stochastic orders (usual stochastic ordering, hazard rate, likelihood ratio, stop-loss ordering etc) have found applications in collective risk theory. Intuitively, a problem of central interest is: under what conditions, and for which types of stochastic orders, can the ordering between individual risks be transferred to a similar (or weaker) ordering for the total losses in an insurance portfolio? At a next level, similar questions can be addressed in ruin theory: given that two individual risks, X and Y, are ordered in |

| | | | | some sense, can something similar be said for the time to ruin (or, the number of claims until ruin) in two portfolios, one with individual losses distributed as X and the other distributed as Y? |
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| Stefanos I. Karnavas | The contribution of New Technologies in enhancing teaching of Sciences in Merchant Marine Academies of Greece. | Kyriazis Athanasios | Douligeris Christos Mr. Sevroglou Vasileios | The aim of this PhD thesis is the analysis of the current situation in Maritime Education in Greece (Merchant Marine Academies of Greece) and the construction of a model that can be used to evaluate the performance of teaching methods, methodologies and techinques that make use of new technologies (NT).

It also aims at developing an intelligent system drawing on data mining technologies in order to define the contribution of NT in students learning achievements |
| Mandalis Petros | Mining knowledge from large scale mobility data | PelekisNikos | . E. Kofidis, Theodoridis, N. Pelekis | The goal of the PhD thesis is to design novel predictive methodologies for large scale mobility data. |
| Sideridis Stylianos | Simulation of mobility behavior by extracting knowledge from Big mobility data. | N. Pelekis | Y. Theodoridis N. Pelekis | Mobility data, and especially moving objects' trajectories, are produced by position sensors (eg GPS devices) and are collected in huge quantities in data management systems. This constitutes a rich data source for the extraction of motion and behavior patterns that is useful for a wide range of applications and services. The extraction of knowledge from a large volume of this type of data leads to the discovery and thus to the understanding of patterns of motion behaviors. The goal of this thesis is the use of such kind of patterns to simulate the mobility of various types of moving objects. |
| Victor Trapouzanlis | Contribution to the development of techniques and algorithms for the | H. Evangelaras | M. Koutras S. Chadjiconstantinidis | The construction of an efficient design for the collection and analysis of experimental data is a particularly interesting problem, mainly due to the limitations of the problem under study |

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| | construction of efficient factorial designs | | | (nature of the problem, restrictions on experimentation, reliability of results). Several techniques (theoretical and / or algorithmic) have been proposed in the literature for the construction of efficient experimental designs. This dissertation aims at the improvement of known techniques as well as the proposal of new ones, mainly for situations that have not been satisfactorily addressed by the existing approaches. In cases where the construction is based solely on the use of algorithms, it may be necessary to develop open source software. |
| Vliora Polyxeni | Actuarial risk measures and elasticity phenomena in loss distributions | Psarrakos G. | Xanthopoulos S. Politis K. Psarrakos G. | This dissertation focuses on the development of actuarial risk measures based on theories of distorted and weighted expectations. The new proposed measures will be applied to the construction of premiums and actuarial indices. Elasticity phenomena will be investigated, for example how small changes (perturbations) in the loss distribution affect distorted risk measures. Applying the theory of distorted expectations to various categories of distorted functions, risk measures will be studied and new indices for measuring the right tail of claims will be proposed. Furthermore, elasticity phenomena will be considered in weighted premiums, using a positive parameter that creates an intermediate premium between two well-known premium principles for the decision maker. |
| Kanakoudis George | Direct and Inverse Elastic Scattering Problems in a Piecewise Homogeneous Medium | Sevroglou Vassilios | Stratis Ioannis, Pelekanos George | The problem of elastic wave scattering by a piecewise homogenous non penetrable scatterer with time-harmonic dependence, is studied. The smooth boundary of the scatterer is consisted by two parts, each one having a *Robin*type boundary condition with different impedance constants. Initially, we study the direct scattering problem using the variational formulation method, as well as the integral equation one. The corresponding inverse scattering problem will be |

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| | | | | presented, and its well posedness will be also studied. Furthermore, an inversion algorithm regarding the geometrical reconstruction of the scatterer as well as the determination of its physical properties will be established. Finally, applications and reconstruction numerical examples will been given, showing the applicability of the method. |
| Lallas Konstantinos | Stochastic Modelling for Elastic Wave Scattering by Point-Sources for the Navier Equation | Associate Professor Sevroglou Vassilios | Professor Stratis Ioannis, Professor Yannacopoulos Athanasios | The stochastic direct and inverse scattering problem of elastic waves, for a random source driven by an additive white noise, is studied. Initially, the stochastic Navier equation for elastic waves is presented, and the well-posedness of the deterministic and the stochastic direct problem, will be established. Given the source and its connection to the direct problem, the displacement of the random wave field will be determined.<br><br>Further, the corresponding inverse problem is presented, and the mean and variance of the random source from the boundary measurement of the elastic wave field will be reconstructed. Using the expectation and variance of the solution, *Fredholm Integral Equations* of the first kind, for the inverse stochastic problem are established. These *Fredholm Integral Equations* of the first kind are ill-posed, due to the distribution of singular values for our integral equations. |
| Georgakis Vasileios | Healthcare RiskManagement-A Big Data Approach. | Xenos Panagiotis | Bersimis Sotiris<br><br>Tzavelas Georgios | Health organizations face multiple legal, political, economic, and ethical risks that conform to the American model of health care. However, the continued progress of information systems and data processing methods has added an important management tool, Big Data.  The research field of this thesis concerns the utilization of pioneering methods for the qualitative evaluation of large volumes of data related to risk management in health organizations.  This level also includes the determination of a burning risk, called clinical, with high medical and financial parameters for the health organizations. |
| Jacob-David Economides | Stopping times with applications in Finance and Risk Management | M. Boutsikas | D. Antzoulakos<br><br>M. Boutsikas<br><br>E. Vaggelatou | The main aim of this doctoral research is the development of analytical as well as computational methods for studying and determining the distributions of certain stopping times and other related quantities, |

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| | | | | as well as their application in practical models in mathematical finance and risk management. The main effort will be mainly focused on the study of the stopping time (i) until a surplus process exceeds a certain safety level or falls below zero (in ruin theory), (ii) until the stock price of a security exceeds a threshold signaling the exercising or disabling an option (in mathematical finance); (iii) until one or more credit events related to a basket of entities occur (in credit default swaps) (iv) until the market value of a company falls below a certain level, e.g. below all its liabilities (in structural credit risk theory). |
| Tsiligkiri Christina | "Management of Operational Risks in Sports and Tourism" | Chadjikonstantinidis Efstathios | Varelas Sotirios<br><br>Xenos Panagiotis | The proposed phD thesis focuses on risk management methodology, such as the risks of natural disasters, the risks related to the health and life of employees and customers, financial risks, terrorist risks, etc., which are mainly related to the operation of the structures of the tourism and sports industry, with applications in the Greek case, The risk management process aims to reduce uncertainties during the occurrence of one or more injurious eventualities. A complex tourism and sports organisation must be prepared for unexpected events that may occur in the future, and it is important that it has created an exante risk management plan.<br><br>a tourist and sports organization, initially a thorough inventory and analysis of possible scenarios of operational risks is necessary. Then, through modern probabilistic models used in actuariality and especially in risk theory, a quantitative analysis of the above risks will be carried out, per separate risk category, as well as the calculation of the total level of risk. In addition to recording the most important risk categories, the proposed doctoral dissertation will attempt to construct a methodological framework for the assessment of various operational risks, with applications in |

the Greek case. To this end, historical loss data from the occurrence of operational risks will be used and we will try to estimate the distribution of the total loss-receivables for each homogeneous category of operating risks in order to estimate the total operational risk, and then measure the risk by calculating various risk measures, such as VaR (Value at Risk) or TVar (Tail value at risk) or the expected loss for the sub-estimate distribution. Finding the distribution of the total losses of operational risks of a tourist or sports organization, collective risk, is a complex issue, and will be studied mainly through the LDA (Loss Distribution Approach) method, which uses Collective Risk Models, which are also used in Actuarial Science and especially in Risk Theory. These are known to be described through random sums of random variables. In this work through the LDA we will try to assess the appropriate collective risk models for each homogeneous category of operational risks, assessing the appropriate distributions that describe both the frequency of operational risks and the distributions of the corresponding losses they cause, always with the aim of assessing the total operational risk. It will also be attempted to construct operational risk models for large losses (exceeding a specific threshold, threshold) using delta methodology (through finding appropriate risk factors) and extreme value theory to measure operational risk.

Thus, the ultimate purpose of the proposed dissertation is the quantitative assessment of the total operational risk of a complex tourism and sports organization through various appropriate models, and the

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| Charis Bligoridis | Improved control charts for monitoring censored data | Demetrios Antzoulakos | Athanasios Rakitzis<br><br>Sotirios Bersimis | The main aim of the PhD Thesis is control charts construction for monitoring time between events (TBEs) in the presence of right censored data (type I and type II). The theory of runs and patterns will be applied to Shewhart, CUSUM and EWMA control charts in order to improve their efficiency using as performance measures the conditional mean and conditional median of the run length. |
| Anna Kouroukli | Estimation for functions in renewal models and their applications | Konstantinos Politis | Michael Boutsikas<br><br>Vaios Dermitzakis | The purpose of the thesis is the construction of estimators, with appropriate properties, for functions playing a key role in renewal theory and its applications. More specifically, using a random sample from the distribution F of the interarrival times in a renewal process and with the empirical distribution function as a main tool, the construction of estimators for the functions of interest and their properties will be investigated.<br><br>The proposed method will first be applied to various models of renewal type (ordinary, alternating and superimposed renewal processes). In the sequel, applications in other areas, such as in reliability theory, will be examined. |
| Karaiskos<br><br>Iraklis-Nikolaos | Increase in retirement expectan | Georgia Verropoulou | Platon Tinios<br><br>Konstantinos Politis | The aim of this PhD thesis is to investigate the relationship between increasing retirement age and life expectancy. As life expectancy continues to increase globally, it becomes necessary to develop a strategy for increasing the retirement age in order to ensure the long-term sustainability of pension systems and to address the potential challenges associated with an ageing population. This research proposal aims to investigate the potential impact of increasing the |

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| Dionysia Chaidemen aki | Determinants of Acti ve Ageing, good me ntal health and prod uctivity:<br><br>A longitudinal study i n European countrie s, comparing policies and<br><br>predictive models | Georgia Verropoulo u | George Tzavelas<br><br>Cleon Tsimbos | The aging of the worlds' population combined with the low birth rate, is changing the age structure of society, affecting many areas of the social and economic policy of each state. This long-term change in life expectancy highlights the concept of "active ageing".<br><br>This thesis will draw on information from the last three waves of the European SHARE platform, investigating changes over time in social, demographic, economic and other factors related to productivity, active aging and good mental health. In addition, the causal relationships between the variables will be examined with the ultimate goal of finding a model for predicting productivity and active aging, aimed at a future use in designing policies that improve quality of life for the elderly. |