Kybernetes

Guest Editorial: Soft Computing in Economics and Business

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INTRODUCTION

Soft Computing in Economics and Business is becoming very popular in the literature because it offers practical techniques to deal with the complex information of our world (Gil-Aluja, 1999; Gil-Lafuente and Merigó, 2010; Merigó et al. 2015a). Soft Computing includes a wide range of methods and techniques including fuzzy sets and systems, neural networks, evolutionary algorithms, probabilistic reasoning and other related tools (Yager et al. 2013; Zadeh, 1965). This special issue aims to present some of the newest advancements in this direction including contributions in economics, finance and management. The title of the special issue is "Soft Computing in Economics and Business" and presents extended versions of selected papers presented at the International Conference of the International Association for Fuzzy-Set Management and Economy (SIGEF 2015) held in Girona (Spain) between 6 and 8 July, 2015. The conference was sponsored by the Faculty of Economics and Business of the University of Girona. About 100 people from 20 different countries participated at the conference.

Focusing on Kybernetes, we see that it has grown a lot throughout time. Now, the journal is close to become fifty years old and it is a well-established and recognized journal in the international scientific community. Currently, it has an impact factor of 0.637 in the latest edition of the Journal Citation Reports of the Web of Science. According to Web of Science (WoS) Core Collection, Kybernetes has 3110 articles. By using some bibliometric indicators (Merigó et al. 2015b), we see that the total number of citations received is 6982,

the *h*-index (Hirsch, 2005) is 27 and the average citation per item is 2.25. Table 1 presents the ten most cited papers in Kybernetes of all-time according to WoS Core Collection.

Table 1. 10 most cited papers of all-time in Kybernetes

R	TC	Title	Author/s	Year
1	312	Convergence of Adomian method	Y Cherruault	1989
2	93	On choosing between fuzzy subsets	RR Yager	1980
3	88	Fuzzy pattern matching	M Cayrol; H Farreny; H Prade	1982
4	84	Theory of grey systems	Y Lin; MY Chen; SF Liu	2004
5	78	Representation theorems for fuzzy concepts	CV Negoita; DA Ralescu	1975
6	76	A new definition of the Adomian polynomials	RC Rach	2008
7	72	A theory of concepts and their combination - II	D Aerts; L Gabora	2005
8	63	New numerical study of Adomian method applied to a diffusion model	N Ngarhasta; B Some; K Abbaoui; et al.	2002
9	57	A theory of concepts and their combinations - I	D Aerts; L Gabora	2005
10	56	Information, prediction and structural whole	Y Lin	2001

Abbreviations: R = Rank; TC = Total citations.

After a careful review process, thirteen papers have been selected for publication in this special issue of Kybernetes titled “Soft Computing in Economics and Business”.

First of all, the special issue begins with a preface from the honorary president of SIGEF, Jaime Gil Aluja, that introduces a general overview of ideas about fuzzy logic and economic science. This time, his focus is on the importance that these tools may have on the European economy.

The first paper, by Laura Lanzarini, Augusto Villa-Monte, Aurelio Fernández-Bariviera and Patricia Jimbo-Santana, presents some credit scoring rules using modern algorithms based on learning vector quantization (LVQ) and particle swarm optimization (PSO). This approach represents a new contribution in the analysis of credit risk management, which is a key issue in financial corporations. The study focuses on developing classification rules that can deal with nominal attributes.

The second article, by Jaime Gil-Aluja, analyzes the basis for establishing one or more Europes. For doing so, he uses a wide range of algorithms for dealing with the complex information including the method for establishing the maximum similarity subrelations, the Pichat algorithm and the theory of affinities. Several tools are used in this analysis including the Hamming distance, the Euclidean distance and Galois lattices.

In the third paper, Montserrat Yepes-Baldó, Sefa Boria-Reverter, Marina Romeo and Luis Torres develop a comparative analysis between expertons and uncertain averaging operators and correlational approaches. This comparison is carried out with a case study in corporate social responsibility and effectiveness systems. The authors use several modern aggregation operators including the uncertain weighted average (UWA), the uncertain ordered weighted average (UOWA) and the uncertain probabilistic weighted average

(UPWA). In order to assess the imprecise information of the environment, the authors use interval numbers that can represent the information considering an upper and lower bound.

The fourth paper, by Victor Alfaro-García, Anna M. Gil-Lafuente and Gerardo Alfaro-Calderón, considers a fuzzy methodology for innovation management measurement. They use several methods and techniques especially focused on the theory of forgotten effects and fuzzy relations in order to build the innovation model.

The fifth article, written by Klender Cortez-Alejandro and Martha del Pilar Rodríguez-García, uses a multi-criteria approach under uncertainty to assess sustainable portfolios of the organization for economic cooperation and development (OECD). The work uses portfolio theory and genetic algorithms. Several techniques are considered including Jensen's alpha, Sharpe ratio and nonlinear programming. The case study uses a sample of almost one thousand firms from Europe, Asia, America and Oceania.

In the sixth paper, M. Teresa Sorrosal-Forradellas, Lisana Martínez and Antonio Terceño, analyze if the European sovereign bonds are in concordance with the general macroeconomic variables evolution. The sample considers European countries between 1999 and 2013. The methodology is carried out by using self-organizing maps. The analysis is able to identify significant connections in the Eurozone, especially during the last financial crisis.

The seventh work, by Xavier Piulachs, Ramón Alemany and Montserrat Guillen, compares emergency care usage and longevity and identifies that they have opposite effects on health insurance rates. The authors develop a longitudinal analysis and obtain dynamic estimations of event probabilities. They develop joint models for personalized survival curve adjustment. The sample focuses on individuals aged 65 years or more who are covered by a private insurance policy.

The eighth paper, by Valeria Scherger, Antonio Terceño and Hernán Vigier, study several aggregation operators and distance measures based on the OWA distance (OWAD). Particularly, they analyze the goodness index and verify the superiority of the minimum t-norm over other decision rules. This approach is very useful to classify the causes or diseases that affect business failure.

In the ninth article, by Jyrki Savolainen, Mikael Collan and Pasi Luukka, they develop a cycle reverting price process in modeling metal mining project profitability. They suggest the inclusion of managerial estimates of long-term market price trends. The model is based on a net present value based simulation and stochastic differentia equations. The objective is to include expert information about price cycles in the metal mining investment analysis.

The tenth paper, by Vasile Georgescu, presents genetic algorithms to evolve interval type-2 fuzzy logic systems in order to predict bankruptcy. The main advantage of this approach is

that it provides a deeper representation of the information that type-1 fuzzy logic systems can do. The authors present a wide range of issues related to type-2 fuzzy systems including type-2 membership functions, fuzzy rules and enhanced Karnik-Mendel algorithms. The authors develop several simulations for studying the performance in predicting bankruptcy.

The eleventh article, written by José M. Brotons and Manuel E. Sansalvador, presents a new approach for dealing with uncertain environments where the information is assessed with fuzzy numbers that represent the minimum and maximum value that can occur and the possibility that the internal values will occur. The focus is on the valuation of quality management systems with fuzzy information. For doing so, they introduce a new type of OWA operator: the BADD-FIOWA operator. This operator uses fuzzy information and induced aggregation operators together with BADD distributions.

In the twelfth work, Eric Alfredo Rincón-García, Miguel Ángel Gutiérrez-Andrade, Sergio Gerardo de los Cobos-Silva, Roman Anselmo Mora-Gutiérrez, Antonin Ponsich, and Pedro Lara-Vazquez, develop a comparative study of methods based on algorithms for analyzing the population in situations of districting problem. For doing so, the authors use techniques from particle swarm optimization and artificial bee colony.

Finally, in the last paper, Dolors Corominas, Joan Carles Ferrer-Comalat, Salvador Linares-Musarós, and Xavier Bertran, study the strong Allee effect with fuzzy information and analyze applications in economic problems. Note that the Allee effect analyzes the evolution of specific population groups characterized by low density levels that can bring survival problems.

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Guest editors

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