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Zakynthos Island, Greece, July 16-20, 2015

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Plenary Lecture 1

Oil Spill Response in a Semi-Closed Sea Basin by means of a Contingency Plan based on Fuzzy Logic - The Case of South-East Mediterranean

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Abstract: A contingency plan aiming at prevention of accidental marine pollution, mainly due to hydrocarbons release, consists of a set of general guidelines, expected to become more specific when a certain pollution episode takes place. These guidelines form a dynamic network, where the nodes are the alternative/possible preventive/corrective actions that might be done; the interconnection of nodes signifies which actions are (or might be) in series and which in parallel. Although the guidelines should be simple and explicitly expressed in order to be comprehensible by all people (usually belonging to different specialties at various cultural levels) involved in such an emergency situation, the background upon which they stand includes processing of complex information on a real time basis. Since the events (and the relevant variables/quantifiers) of the pollution episode are stochastic, probabilistic or possibilistic methods should apply, making use of probability density functions or fuzzy sets, respectively. In order to cope with real situation applications, we have developed an Expert System (ES), in a modified fuzzy version to count for uncertainty, which consists of (i) a Knowledge Base (KB) with relevant information (at proper granularity level) and knowledge acquired by experience or extracted from other KBs by means of an Intelligent Agent (IA), and (ii) an Inference Engine (IE) combining Model/Rule/Case Based Reasoning (MBR, RBR, CBR, respectively) within an original interactive mode. Implementation of this ES is also presented, concerning (i) the Aegean Sea and certain areas between Crete and Cyprus and (ii) the region between the West Greek Shoreline and the islands of the Ionian Sea.

Brief Biography of the Speaker: Prof. Fragiskos Batzias holds a 5years Diploma and a PhD degree in Chemical Engineering, and a BSc in Economics. He has also studied Mathematics and Philosophy. He designed/developed the Laboratory of Simulation of Industrial Processes and the Research Group on Systems Analysis at the Department of Industrial Management and Technology of the University of Piraeus, Greece. He is teaching at the postgraduate courses (i) Systems of Energy Management and Protection of the Environment, running by the University of Piraeus, and (ii) Techno-Economic Systems, running by the Electr. & Comp. Eng. Dept. of the Nat. Tech. Univ. of Athens in cooperation with the University of Athens and the University of

Piraeus. His research interests are in chemical engineering systems analysis and knowledge based decision making. He has >100 publications in highly ranked journals and conference proceedings, including 29 research monographs in collective volumes, with 652 citations and an h-index of 13 (Scopus). He has participated (and chaired after invitation from the organizers) in prestigious international conferences, such as those organized periodically by the IEEE, the European Federation of Chemical Engineering (EFCE), the DECHEMA, CHISA, WSEAS Organizations. He organizes the annual Symposium on Industrial and Environmental Case Studies running successfully since 2004 within the International Conference of Computational Methods in Sciences and Engineering (ICCMSE).