



Computational Fuzzy Processing of Uncertainty in Environmental Modelling and Simulation

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Shaker Verlag Dez 2010, 2010. Buch. Book Condition: Neu. Neuware - Impreciseness, incomplete knowledge, linguistic vagueness and randomness are the main sources of uncertainty in environmental engineering. The enhancement of the information content of environmental data by including a quantification of the resulting uncertainties is very important to help the engineer make better informed decisions. The development of a fuzzy mathematical and computational framework for the consistent estimation and propagation of the uncertainty that is induced by the inherent impreciseness and incomplete knowledge in environmental data and simulation techniques for the purpose of a well-informed decision making process is the subject of this thesis. A robust mathematical framework of fuzzy numbers based on their interpretation as possibility distributions are introduced and further developed. The adoption of the concept of non-separable fuzzy points in this thesis has fulfilled the usually missing consistency of fuzzy functions with the possibility and necessity measures. Differentiation and integration of fuzzy functions with domains of fuzzy numbers are developed so that uncertainties inherent in the measured quantities as well as in the coordinates of the samples of environmental data sets are correctly dealt with. The computational foundation of fuzzy environmental modelling and simulation is also improved. An enhanced evolution strategy is developed to correctly evaluate the α -cut sets formulation...



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