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TITLE OF DIPLOMA THESIS:

STOCHASTIC AND FUZZY PROGRAMMING IN SUPPLY CHAINS

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ABSTRACT

The aim of this dissertation is to highlight the important role that uncertainty in supply chains plays in various optimization models. Previously, many deterministic optimization methods were applied, without approaching at acceptable level realistic conditions, which include numerous types of uncertainties. Therefore, accounting for uncertainty in modern supply chain models is proved to be very effective in providing solutions to unexpected events. Uncertainty can be categorized, according to the way it arises, into fuzziness and stochastic uncertainty. This thesis is focused on the first category and more specifically on fuzzy programming problems, analyzing their modeling and optimization steps. In conclusion, a transformation of an existing dynamic deterministic mixed-integer linear programming model to a fuzzy one is attempted, by considering as fuzzy: 1) the constraint that sets an upper bound for the possible shortages at the construction sites in order to express its flexibility and 2) the parameter of unit purchase cost of products from suppliers, which is a coefficient of the objective function, in order to express the deficient knowledge in data (meaning that its value often changes).

KEYWORDS

Supply Chain Management (SCM), Fuzziness, Stochastic Uncertainty, Fuzzy Programming, Stochastic Programming, Modeling and Optimization of Fuzzy Problems