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Industry 4.0 and Hyper-Customized Smart Manufacturing Supply Chains

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Chapter 6

Multi-Objective Optimization of Economic and Environmental Aspects of a Three-Echelon Supply Chain

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Abstract:

It is very relevant in today's competitive world for suppliers to ensure that customer demanded products are made available. Customers expect to obtain a product that has benefits and are available within an acceptable price and time. It is necessary for companies to optimally use their ability to satisfy customers' specified needs. Researchers and industries are working on developing green supply chain concept in the last few years due to environmental concerns. The objective of this chapter is to propose a three-echelon supply chain model that optimizes economic and environmental objectives simultaneously. The objectives considered are minimizing the total supply chain cost and minimizing CO₂ emission of the supply chain network. The proposed model falls into NP-hard category. Multi-objective genetic algorithm is proposed to solve the proposed model and illustration is provided to explain the use of the proposed model. A procedure that could be followed to find the best possible solution based on user's choice among the Pareto front solutions is also explained.

Keyword: Environmental Aspects; Optimizes Economic; Genetic Algorithm