Multi-product Inventory Supply and Distribution Model with Non-linear CO_2 Emission Model to Improve Economic and Environmental Aspects of Freight Transportation

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Abstract Freight transportation is crucial for the appropriate flow of products throughout the supply chain. However, transportation also generates large quantities of pollutants which are released to land, air, and water resources around the World. In emerging economies, sustainable and environmental strategies are required to ensure their active and free integration into the main global economic and political systems. Within this context, the contributions of the present work consist of (a) a distribution model with a heterogeneous fleet, updated CO_2 metric, and multi-product inventory supply strategy, and (b) a model based on Artificial Neural Networks to estimate CO_2 emissions for a heterogeneous fleet. Both contributions are aimed at improving environmental transportation practices in emerging economies through the minimization of emissions considering optimal lot sizes and enhanced estimation of CO_2 emissions.

Keywords CO_2 emissions · Green logistics · Vehicle routing problem · Multi-product supply chain

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