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## **An extended integrated inventory model with carbon emission**

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Nowadays, inventory supply chain management plays an important role in the competitive world. To minimize the expenses of both parties, producers' and buyers' inventories should be managed properly. So, through the supply chain, they should control the costs of production, transportation and inventories. Besides, in order to maintain a green environment and reduce fuel waste, consideration of carbon emissions of transport vehicles is desirable. Many governments enforce carbon tax regulations in order to decrease this carbon emission and maintain a sustainable supply chain. Therefore, in this study, we first extend an existing model for supplying a single product from multiple suppliers to multiple buyers with carbon emission tax. Our extended model includes the inventory cost of a product during transportation and at the buyers' side along with the transportation cost + carbon emission tax. We assume both the demands and the supplies vary within an interval range, so the total system cost falls within an interval range too. Then, the extended model is solved using the LINGO solver and total cost bounds are obtained. According to the numerical analysis, the integration of inventory, transportation and carbon emission costs influences the total cost boundaries in a sensible way. Moreover, we intend to devote ourselves to further extension of this extended model by incorporating producers' inventories, variations in lead time and an appropriate trend of demand distribution.

*Keywords: Inventory cost; Integrated inventory, Transportation, Carbon emission, Supply chain.*