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# Production routing problem with emission minimization

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## Abstract

Integration of operational decisions of different functions of the supply chain has been identified as an important success factor in minimizing their total costs. Traditionally, supply chain optimization has merely concentrated on the economic aspect of the sustainability, neglecting its environmental and social aspects. However, with the growing concern towards green operations, the impact of short term decisions on reduction of carbon emissions could no longer be overlooked. Only recently some papers start to consider environmental issues in the integration of production and distribution decisions. Aiming to compare the effect of operational decisions not only on cost but also on emissions, in this talk, we reassess the well known production routing problem under new objectives. We study an integrated system dealing with production, inventory, and routing decisions, in which the commodity produced at the plant is shipped to the customers over a finite time horizon. We measure several metrics under different scenarios, namely when minimizing total costs, only routing costs, or minimizing only emissions. Each solution is evaluated under all three objective functions, and their costs and business performance indicators are then compared. We provide elaborated sensitivity analyses allowing us to gain useful managerial insights on the costs and emissions in integrated supply chains.

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