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MATHEMATICAL MODELING TO MINIMIZE POLLUTION FROM VEHICLES IN WASTE MANAGEMENT. A CASE STUDY

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Abstract

To cope with global warming and avoid unpleasant phenomena such as droughts, water scarcity, famine, and diseases, countries will undoubtedly have to plan and implement detailed, reliable, sustainable, and coordinated measures, especially in Western Asia (*i.e.*, the Middle East).Therefore, people, governmental organizations, and non-governmental organizations have some responsibilities to fulfill. Greenhouse gas (GHG) emissions and air pollution remain major contributors to global warming. The transportation sector accounts for a major portion of GHG emissions. As a result, less polluting vehicles and optimal road design can play a key role in mitigating GHG emissions and environmental pollution. In this study, a novel mathematical model was employed to optimize pollution from waste collection trucks in a village. A desk method was then used for data collection from satellite-based images. As per data analysis in LINGO, the optimal tour was found to release 46.52 g of pollutants. A 3% reduction in air pollution can be expected if relevant managers adopt the optimal waste collection tour obtained in this study.

Key words: environment, environmental pollution, graph theory, optimization, pollution reduction, routing

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