

WonderMarket Internal Report

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MATH3202 Assignment 1
Due 15/03/2019 12:00 pm

Abstract

We have been approached by WonderMarket to optimise their supply chain logistics. Given information about their costs and needs, we created and optimised a model using Gurobi. This report describes the model and its solution.

Model Definition

WonderMarket operates a number of stores and distribution centres (DCs). Each week, each store requires some amount of goods (measured in truckloads) to be delivered from one or more of their distribution centres (DC).

Sets

S set of stores.
 D set of distribution centres.

Data

$C_{d,s}$ cost of moving one truckload of goods from DC d to store s (comm 1).
 R_s number of truckloads required at store s per week (comm 1).
 M_d maximum capacity (truckloads) which can be send from d per week (comm 2).

Variables

$X_{d,s}$ number of truckloads to be moved from DC d to store s .

Objective

$$\min \sum_{s \in S} \sum_{d \in D} C_{d,s} X_{d,s}$$

Constraints

Communication 1

Each store receives sufficient goods. For $s \in S$,

$$\sum_{d \in D} X_{d,s} \geq R_s.$$

Communication 2

Each distribution centre's capacity is not exceeded. For $d \in D$,

$$\sum_{s \in S} X_{d,s} \leq M_d.$$