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Third-party logistics providers(3PLs) are companies that manage transportation for clients. They consolidated shipments by receiving delivery requests from a several customers to fill up a plane. For example, an express company such as UPS and FedEx take the shipments from several companies and deliver them to the destinations. However, each customer provides different profits and required volumes are different as well. Lastly, the total capacity of the plane is set as 5000 cubic feet so this constrain should be met.



Discussion

Our objective is to decide which customer to choose to fil up your plane. Therefore, decision variable will be binary (1 means choosing the customer, 0 means not choosing the customer). To decide whether we will select that customer depends on the total profit from moving items for that customer. Here, our objective is to maximize the profit and make sure the volume of the items does not exceed the capacity of the plane.

Mathematical Model

Parameters (Inputs)

i {1,2,3,4,5}, i: index for customer

 : The profit from satisfying customer i’s shipment; i {P1:3000, P2:1500,…P5:1200}

 : The volume requirements for customer i’s shipment I {V1:2100, V2:1300,...V5:1000}

V: Max Volume of a plane; V = 5000

Decision Variables

: Decision on whether to satisfy i customer’s shipment requirement

Objective

Max total profit

Constraints

(1) V; (1) Max volume that a plane can carry

(2) {0,1} (2) Binary decision

Excel Implementation

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