Motivation

- Global competition among parcel and post industry force them to extend their business.
Motivation

- Growing interest of integrate Demand-Responsive Transit system (DRT) and public transportation.

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*Mobility allowance shuttle transit (MAST) service (Quadrifoglio et al. 2008)*

Motivation

- Traffic congestion on the highways or crowed urban traffic situations.
- Time-dependent travel times in daily vehicle routing problem.
Problem description

The problem is defined on an undirected graph which includes:

1. A number of vehicles with capacity
2. The pickup and delivery nodes with
   - A time window, profits, load and one-to-one relationship
3. The Depot(s)
4. The time dependent travel time function on each link

Travel Time and Arrival Time Functions

Figure 1 Speed and travel time functions.

Figure 2 Arrival time functions.
Problem Description

Select a set of routes which maximize the difference between the total collected profits and the traveling cost.

Methodology

- Branch and price algorithm
  
  Restricted master problem
  
  Simplex method (CPLEX or Gurobi)
  
  Subproblem: find feasible routes
  
  The time-dependent selective pickup and delivery traveling salesman problem with time window

  Time-dependent labeling algorithm with time windows and pickup and delivery (TDLTWPD)
Future Research

- Time-dependent Mobility Shuttle Allowance Shuttle Transit (MAST) service.
- Time-dependent selective pickup and delivery problem with time windows.
- Time-dependent team orienteering problem with time windows.
- Adaptive large neighborhood search heuristic for TDSPDP
- TDSPDP with stochastic profits and customers.

Thank You ! & Questions ?