A fixed route Dial-a-Ride problem

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Dial-a-ride (DARP) is a transportation solution with flexible routes and flexible schedules. The DARP challenge is to optimally fulfill a set of pickup and delivery ride requests using a given vehicle fleet. We hereby present a DARP variant for which the route is known in advance. The problem is then to set up the schedules according to the requests. For a given operation cost, the aim is to maximize user satisfaction, by minimizing the sum of passengers' waiting times. We introduce algorithms for solving two variants of the fixed route DARP - one for a fleet of infinite capacity vehicles, and one for the more general case of vehicles with heterogeneous capacities. Contrary to general DARP which is NP-hard, the presented algorithms are polynomial in the number of ride requests.