Summary: A basic issue in the planning of urban public transport in the determination of headways or inter-dispatch times. During each season, i.e. distinct time-period whose demand characteristics are constant, the following tradeoff must be considered. Dispatching too many vehicles on a route causes high operating costs, while too few vehicles may result in unsatisfactory levels of service. An appropriate policy on headways will help to balance resources between lines (routes) in peak-demand hours and will influence the total number of buses acquired by a transit company.

Previous practice in industry usually bases the planning of headways upon satisfying service criteria on a "most-congested segment". This approach reduces the problem from that of studying a route to that of a single segment (stop), but thereby fails to account for other important information about the line's characteristics. In this article, we develop two new service criteria which consider the line as a whole: (1) "crowding-overdistance" takes into account discomfort resulting from a vehicle carrying too many passengers, and the corresponding distance travelled; and (2) "probability-of-failure", the frequency with which a waiting passenger fails to board due to lack of space. COD will be analyzed using simulation. POF will be related to a finite-dependent Markov chain that is "inhomogeneous" in terms of distance along the route. Optimal headways are those which dispatch the smallest number of buses while meeting the particular service criterion. Models based on each of the two criteria are illustrated and applied to a number of routes of the Israeli transit company, DAN.

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