

Using the Parkride.mac Macro to Model Park and Ride Demand in the Puget Sound Region

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Park and ride lots are seen by transit agencies as a service between rural and urban zones. However park and ride lots represent large capital expenditures for local jurisdictions or for transit agencies that could use the money to provide transit service. For these reasons, improvements were made to the travel demand model to improve the model's park and ride demand forecasting abilities for existing and future park and ride lot locations.

The methodology of modeling park and ride demand begins with the development of a zonal interchange park and ride demand matrix from mode choice. Each park and ride lot is seen as an intermediate destination for each interchange. The park and ride lot locations are coded as centroids in the highway network. The problem then becomes identifying the intermediate destination for each zonal interchange that optimizes the trip subject to various constraints such as park and ride lot capacity. The utility associated with travel by auto from each of the origin zones to each park and ride lot, which is a function of the bidirectional travel cost by auto, is calculated. Similarly, the utility associated with the transit part of the park and ride trip, which is a function of total transit travel time, from each park and ride lot to each destination zone is calculated. The INRO macro ParkRide2.mac then calculates the optimum path from origin zone to park and ride lot to destination zone based on these utilities and constraints. The macro produces, based on the park and ride demand matrix, an auto demand matrix for the auto part of the trip from the origin zones to the park and ride lot zones, which is added to the highway demand. It also produces a transit demand matrix for the transit portion of the trip from the park and ride lots to the destination zones, which is added to walk access transit demand for assignment. The macro incorporates park and ride lot capacity as a constraint and a park and ride lot "attractiveness" measure which can be used to calibrate park and ride demand. A beta version macro supplied by INRO is then used to calculate the auto and transit skims that correspond to the results of the parkride2.mac macro. These skims are then used by the mode choice model in the next iteration of the travel demand model.

The park and ride results are compared to observed park and ride utilization which show a great improvement over previous methods. Data problems, interpretations of the results and suggestions for further research are also presented.

Bio

Mark Charnews is a Senior Modeler at the Puget Sound Regional Council and has been involved in transit and travel demand modeling for almost twenty years. Transportation data collection, GIS analysis and choice theory are among his interests.