A LINEAR PROGRAMMING METHOD FOR SYNTHESIZING ORIGIN-DESTINATION (O-D) TRIP TABLES FROM TRAFFIC COUNTS FOR INCONSISTENT SYSTEMS

by

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ABSTRACT

Origin-Destination (O-D) trip tables represent the demand-supply information of each directed zonal-pair in a given region during a given period of time. The effort of this research is to develop a linear programming methodology for estimating O-D trip tables based on observed link volumes. In order to emphasize the nature of uncertainty in the data and in the problem, the developed model permits the user's knowledge of path travel time to vary within a band-width of values, and accordingly modifies the user-optimality principle. The data on the observed flows might also not be complete and need not be perfectly matched. In addition, a prior trip table could also be specified in order to guide the updating process via the model solution. To avoid excessive computational demands required by a total numeration of all possible paths between each O-D pair, a Column Generation Algorithm (CGA) is adopted to exploit the special structures of the model. Based on the known capacity of each link, a simple formula is suggested to calculate the cost for the links having unknown volumes. An indexed cost is

introduced to avoid the consideration of unnecessary passing-through-zone paths, and an algorithm for solving the corresponding minimum-cost-path problem is developed. General principles on the design of an object-oriented code are presented, and some useful programming techniques are suggested for this special problem. Some test results on the related models are presented and compared, and different sensitivity analyses are performed based on different scenarios. Finally, several research topics are recommended for future research.

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