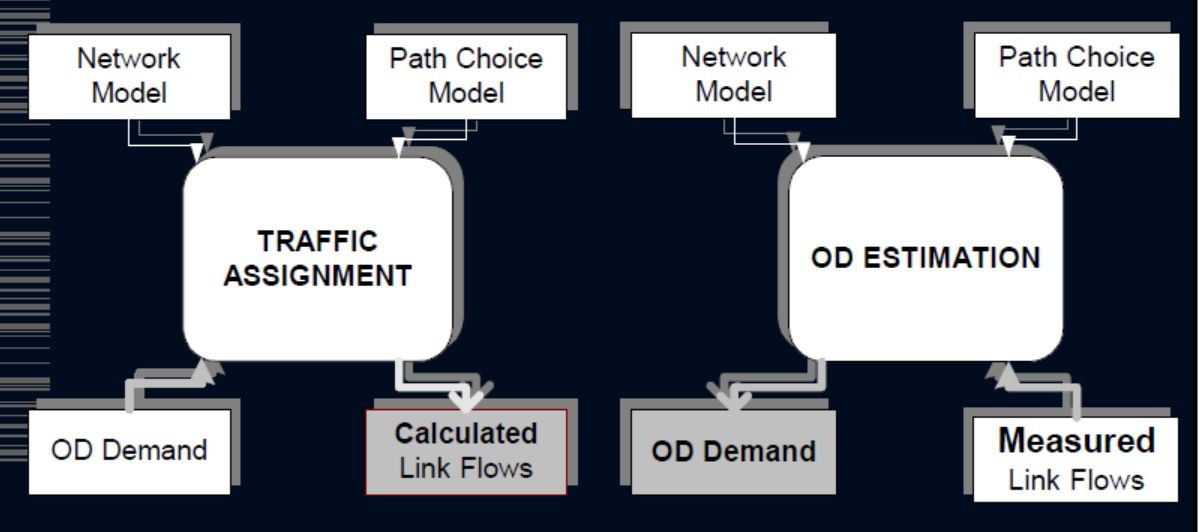
**OD matrix estimation using traffic counts**

**Problem statement:**

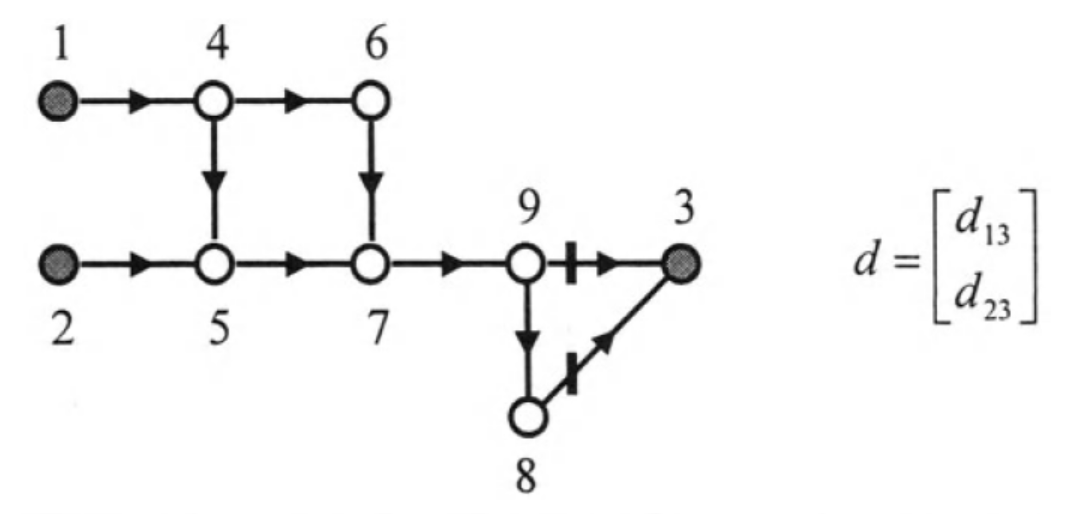
There are two situations related to O-D demand and flow count. The first one is traffic assignment, which aims to calculate link flows starting from O-D flows, network, and path choice model. Vice-versa, the second one is OD matrix estimation, which is to calculate the O-D flows starting from the measured link flows, using network and path choice model (see Fig. 1).

This document covers the methods aiming to describe the estimations of present origin-destination demand flows by combining direct and/or indirect (model) estimators with other aggregate information related to O-D demand flows. The problem of estimating O-D flows by using traffic counts can be considered as the inverse assignment problem. The example is shown in Fig. 2 and it has 9 nodes, 10 links, and 2 OD pairs (1-3, 2-3).



**Figure 1 Relationship between the estimation of O-D flows with traffic counts and**

**traffic assignment**



**Figure 2 Network structure**

**Notations:**

: OD pair to link proportion

: OD pair to path proportion

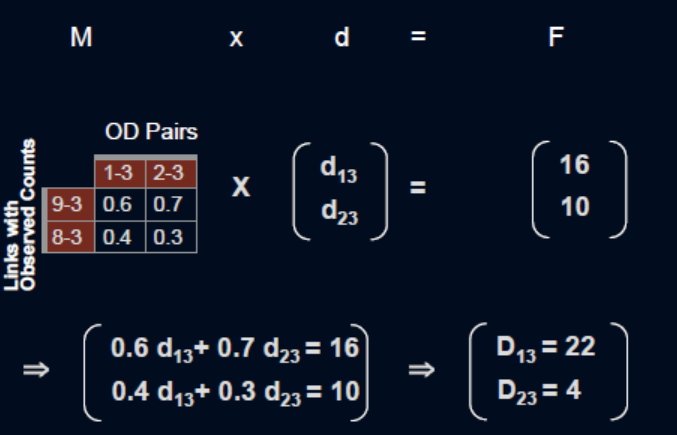
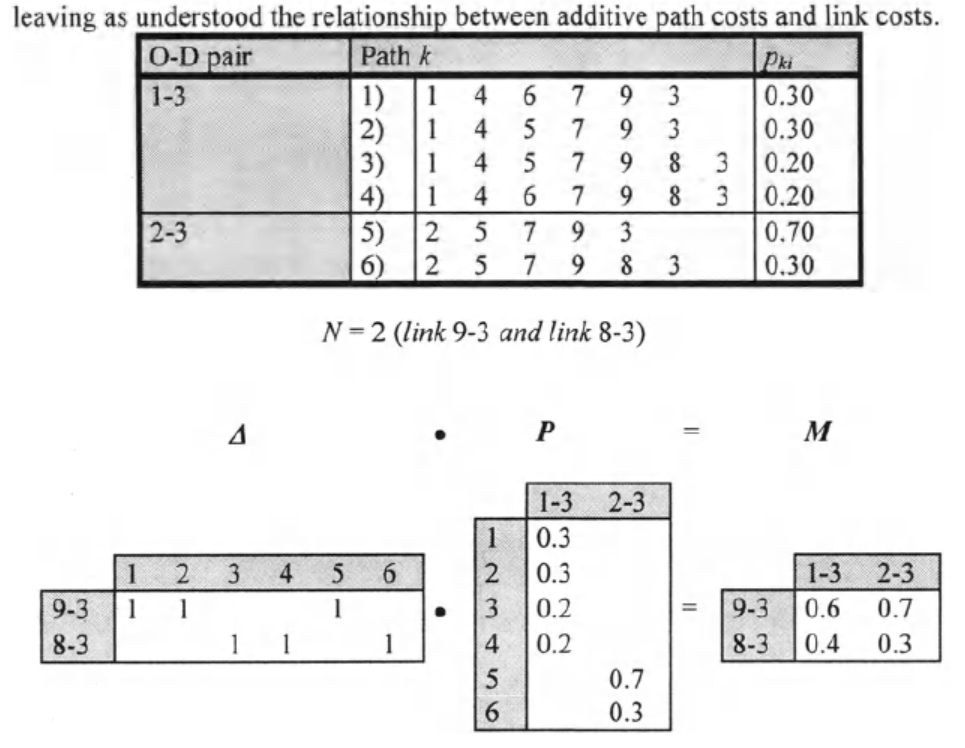
: demand of OD pair

: observed flow counts of link

: link-path incidence matrix, if link is on the path , , otherwise,

**Equations:**

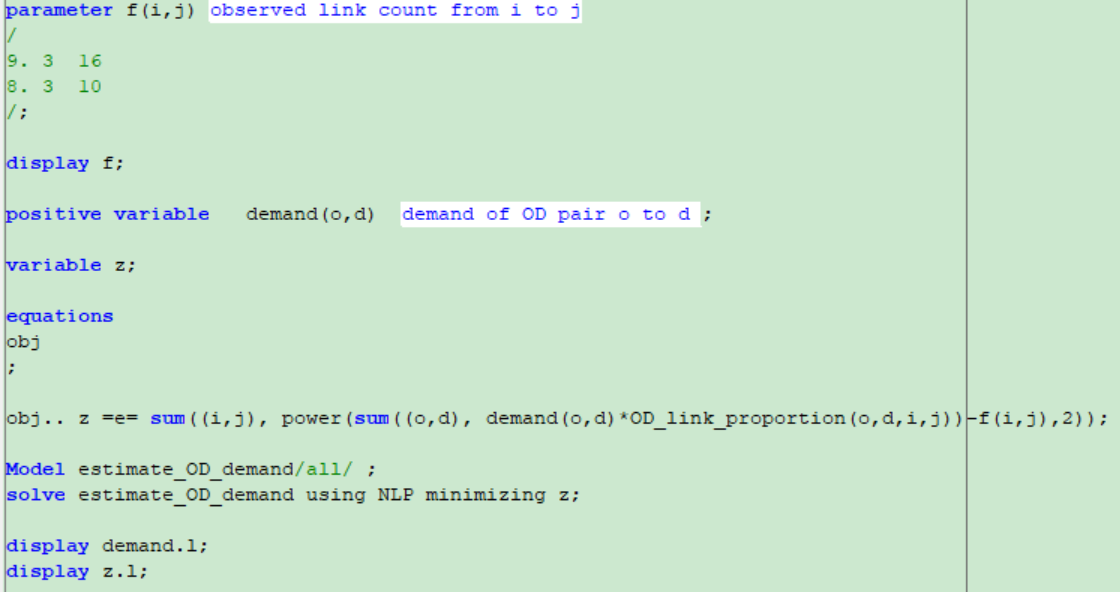
|  |  |
| --- | --- |
|  | (1) |
|  | (2) |
|  | (3) |



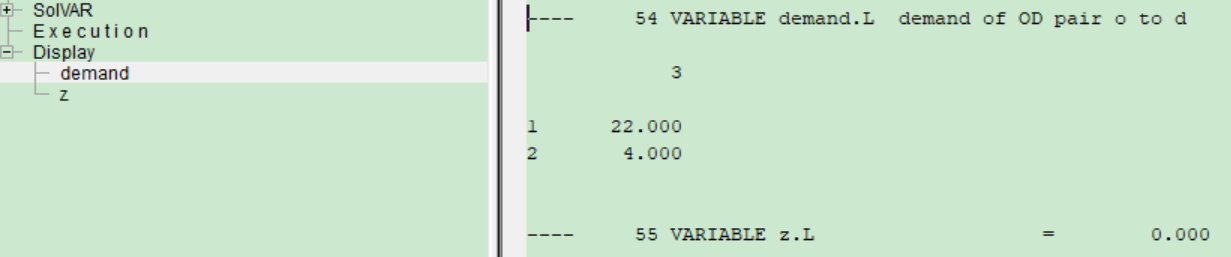
**Figure 3 Analysis by mathematical calculation**

**Analysis by GAMS code:**





**Results:**



***Reference:*** *Cascetta, E. (2013). Transportation systems engineering: theory and methods (Vol. 49). Springer Science & Business Media.*