OD Traffic Volume Inverse Estimation Method
Development of Hourly Variation Coefficient Model

(Research period: FY2018 to FY2020)

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Keywords: traffic survey, OD traffic volume inverse estimation, traffic network analysis, road traffic census

1. Introduction

The Ministry of Land, Infrastructure, Transport and Tourism ("MLIT") conducts a research to grasp one-day OD traffic volume ("census OD survey") once in five years in general. On the other hand, to study congestion control measures and road traffic measures responding to emergent events such as accidents or disasters, it is desired to be able to grasp OD traffic volume according to days and time zones. As a means for estimating the daily OD traffic volume from the daily observation link traffic volume constantly observed with the device, the daily model of OD traffic volume inverse estimation method has been developed. In this study, proposal of an hourly variation coefficient model, verification of the applicability to actual area, and improvement of the method were conducted as a method of grasping OD traffic volume according to time zones, which was developed from the daily model.

2. Proposal and verification of the hourly variation coefficient model

Fig. 1 shows the estimation flow of the hourly variation coefficient model of the OD traffic volume inverse estimation method. Specifically, hourly variation coefficient is estimated using the hourly link traffic volume obtained from the results of census, daily OD traffic volume, and hourly observation link traffic volume constantly observed with the devices on the road.

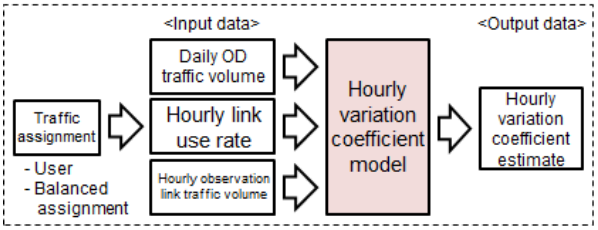

Fig. 1: Flow of hourly variation coefficient model estimation

First, in the Kinki Region, five patterns were set from the hourly variation trend of OD traffic volume and applicability of the model was verified for each pattern. Of the five patterns, Fig. 2 shows the results concerning the ODs located in Osaka-fu and part of Hyogo-ken ((Kobe, South Hanshin, and North Hanshin) ("OD within Hanshin area"). Comparison of the estimated values and the Census values showed that the former had small hourly variations and a deviation from actual traffic condition. This would be because classification of OD traffic volume into 5 patterns complicated the distribution of OD traffic volume among the patterns within the same time zone and unreasonable estimated values were likely to arise, while the hourly variation trend could be reflected according to each OD.

3. Improvement and verification of the model

In order to clear the cause of this problem, the model equation was added with a term to consider the hourly OD traffic volume of the census OD survey results ("Term of census prior information"). The ratio of weight of existing terms and the term of census prior information" was set using the weight coefficient α. Of the results of applicability verification of the improved model, Fig. 2 shows OD within Hanshin area. Compared with the model before improvement, the hourly variation coefficient closer to the census value was estimated, which shows the effectiveness of the improved model.

4. Conclusion

The influence of weight coefficient on the estimation results in the improved model is different according to each pattern of OD traffic volume. Aiming to develop application of the model across the country, we intend to continue the study on the method of setting proper weight coefficient.

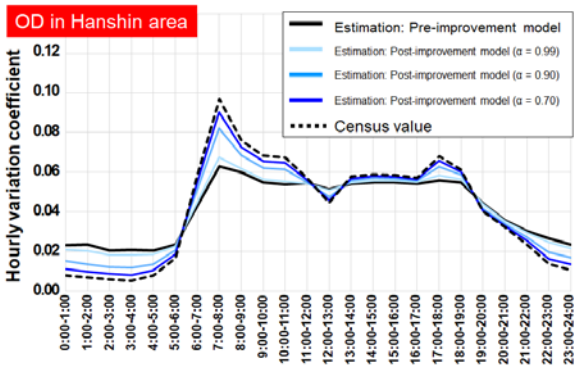

Fig. 2: Results of hourly variation coefficient estimation