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Regional Situation of Commuting from the Area along the Railways in the Southern Tama District in Tokyo

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The purpose of the present study is to analyze the regional situation of commuting from the area along the railways in the southern Tama district in Tokyo. To this end, using 1990 National Census data, the commuting time distribution is analyzed in the 5339-33 second grid square space of the National Standard Grid System of Japan. This study area is approximately equal to a square having sides of 10 km, which includes Tama City and parts of Fuchu, Hachioji, Hino, Inagi, Kawasaki, Machida and Sagamihara Cities. Furthermore, this study area also includes most of Tama New Town which is in the Tokyo Metropolis. The study area is divided into 20 by 20 fourth grid square spaces having sides of approximately 0.5 km. These fourth grid square spaces are adopted as the fundamental regional units of this analysis. However, since National Census data of fourth grid square spaces is only available for Densely Inhabited Districts (DIDs), the present study uses third grid square spaces which are equivalent to 2 by 2 fourth grid square spaces (also called basic grid square spaces) outside of DIDs. Thus, the total number of regional units used in the present study totals 321. In each unit, the commuting time distribution, that is, the number of commuters whose commuting times are within the following intervals: 0-29 minutes, 30-59, 60-89 and 90-, is calculated.

In the analysis process, in order to cluster the fundamental regional units, a method is proposed which uses the Akaike Information Criterion (AIC). This method assumes the commuting time distribution to be determined by a multinominal distribution. If the AIC value decreases by merging a pair of regional units, the pair is considered to share a common probability vector of a multinominal distribution. Therefore, the proposed method merges recursively the pair which has the largest AIC decrease among all possible pairs, until no more pairs exist which reduce the AIC. In previous regional clustering studies, merging separate square spaces is not allowed in the clustering processes. However, in the present study, it is allowed in the clustering process, because the commuting time distribution may be common in separate regions such as those which are at the same distance from a common station. In the present study, the study area, comprised of 321 units, is merged into 86 clusters.

After the clustering process, the proportion of commuters whose commuting times are within each interval is calculated and illustrated using maps. The maps indicate the following:

1) The number of final clusters shows that the commuting time distributions apparently differ between the clusters;

2) Several clusters exist for which the commuting times are extremely small. These clusters are located in Fuchu and Hino Cities, and are believed to be due to company housing of nearby factories;

3) The commuting times of the clusters near the express commuting train stations, such as

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Seiseki-Sakuragaoka,Takahata-Fudo and Tama-Center, are not smaller than those of the other clusters, which suggests that the commuting times are not solely determined by the commuting time to the central business districts of Tokyo;
4) The Tama New Town area in Tama City shows an extremely large commuting time, particularly in the southern part.