

MIGRATIONS OF HETEROGENEOUS POPULATION OF DRIVERS
ACROSS CLASSES OF A BONUS-MALUS SYSTEM

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ABSTRACT

Traditionally, migrations of a single driver across classes of the Bonus-Malus system are modeled as a simple homogeneous Markov chain. Generalization to the case when the modeled object is a population of drivers is straightforward provided all drivers are characterized by the same claim frequency. In practice however, drivers differ in this respect.

The article is devoted to present implications of departure from the assumption on homogeneity of population. At first the probabilistic model of the migration process adequate to the case of heterogeneous population of drivers is introduced. Then the analysis focuses on how much properties of the migration process depart from properties of the homogeneous Markov chain. Also, some consequences of heterogeneity that concern estimators of transition probabilities from empirical data are presented.

The approach presented in the paper might be applied in various areas of empirical research, especially when the process of migrations across the space of states is observed for a large heterogeneous population over a small number of time periods.

KEYWORDS

Markov chain, estimation of transition probabilities, bonus-malus system, population heterogeneity.