

# Random Fuzzy Continuous-Time Markov Jump Processes

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## Abstract

Continuous-time Markov chains are an important subclass in stochastic processes, which have facilitated many applications in business decisions, investment risk analysis, insurance policy making and reliability modeling. One should be fully aware that the existing continuous-time Markov chains theory is merely a framework under which the random uncertainty governs the phenomena. However, the real world phenomena often reveal a reality in which randomness and vagueness co-exist, and thus probabilistic continuous-time Markov chains modeling practices may be not wholly adequate. In this paper, we define random fuzzy continuous-time Markov chains, explore the related average chance distributions, and propose a scheme for parameter estimation scheme. It is expected that a foundational base can be established for reliability modeling and risk analysis, particularly, repairable system modeling.

**Keywords:** Credibility measure, credibilistic fuzzy variable, random fuzzy variable, average chance distribution, random fuzzy Markov jump process, reliability modeling.

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