Availability Analysis of Industrial Systems Using Markov Process and Generalized Fuzzy Numbers

N. Singhal* and S. P. Sharma
Department of Mathematics, Indian Institute of Technology Roorkee, Roorkee, India

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*Corresponding author, E-mail: nehasinghal.iitr@gmail.com

Abstract: The knowledge about the availability of the component states of a system plays a crucial role in studying the assessment techniques of availability of the system. However, component states are often unknown or uncertain, especially during the early stages of the development of new systems. In such cases, it is important to understand how uncertainties will affect system reliability assessment. In the present article, a strategy for the assessment of dependability investigation of industrial systems has been contemplated in more summed up way. In this methodology, reliability/availability has been computed through Markov process. Uncertainty in data has been dealt with generalized fuzzy numbers. Availability of system in transient as well as steady state has been examined in this article. Results have been computed and then compared by performing different arithmetic operations’ approaches. For application perspective of proposed approach, a butter-oil processing plant has been considered. Impact of different arithmetic approaches in the methodology is reflected by numerical calculations and is depicted through the graphs.

Keywords: Availability; Generalized fuzzy number; Markov process; Differential equations