

ANALYSIS OF STOCHASTIC BEHAVIOUR OF MILK POWDER MANUFACTURING SYSTEM WITH HEAD-OF-LINE REPAIR

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Abstract

The paper deals with the analysis of stochastic behavior of milk powder unit of a dairy plant with head of line repair facility .The skim milk powder unit comprises of four subsystems working in series. The failure and repair rates of the subsystems follow the exponential distribution. The mathematical formulation is carried out using probabilistic approach and the Markov birth-death process is used to develop the difference differential equations. The steady state availability expression has been derived using normalizing conditions. The authors have used supplementary variables to convert Non-Markovian system [2], [7], into Markovian. This mathematical model has been solved with the help of Laplace transform. Availability and cost function of considered system have been computed. Steady-state behaviour of the system and some particular cases has also been appended in the end to improve practical utility of the model.

Key Words : *Milk powder plant, Markovian process, Availability, Cost function, Laplace transform, Supplementary variable technique.*