

A STOCHASTIC MODEL OF BATHTUB FAILURE RATE FOR ESTIMATING THE TOTAL RATE OF DNA REPLICATION USING BRANCHING PROCESSES

S. JAYAKUMAR¹ AND S. KARPAGAM²

¹ Associate professor of Mathematics,
A.V.V.M Sri Pushpam College, Poondi,
Thanjavur-613503, India

² Assistant professor of Mathematics,
Rajiv Gandhi College of Engineering,
Nemili, Sriperumbudur- 602105, India

Abstract

The knowledge of various cell cycle kinetic parameters such as the length of the cell cycle and its different phases, is of considerable importance for the several purpose including diagnostics and treatment in clinical health care and a depended understanding of tumor growth mechanisms. Of particular interest as a prognostic factor in different cancer forms is the S phase, during which DNA replicated. We estimate the DNA replication rate and the S phase length from bromodeoxyuridine -DNA flow cytometry data. A bathtub shaped failure rate can be obtained, from mixture of two decreasing failure rate (DFR) models. The failure rate of the mixture of an exponential and weibull distribution with strictly decreasing failure rate is obtained. In a practical point of view, the mixture failure rate is bathtub and the results can be obtained from the mixtures connected with the medical report.

Key Words : *Branching process, Cell cycle kinetics, DFR, DNA replication rate, Failure rate, Flow cytometry, IFR, Mean residual life function, Reliability survival function.*

AMS Subject Classification : 60J85.