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Variance residual life function in discrete random ageing

Summary - The random variable $X_t = X - t | X \geq t$, which is called the residual life random variable, has gathered the attention of most researchers in reliability. The mean and the variance of this variable in continuous distribution have been studied by several authors. But, in discrete case, only in recent years, some studies have been done for the mean of this variable. In this paper, we define and study the properties of variance of $T_k = T - k | T \geq k$ where T is a discrete random variable. Besides similar results for discrete and continuous lifetime distributions, relationships with its mean, monotonicity and the associated ageing classes of distributions are obtained for discrete cases. Furthermore, some characterization results about the class of increasing (decreasing) variance residual life distributions based on mean residual life and residual coefficient of variation, are presented and the lower and upper bound for them are achieved.

Key Words - Hazard rate; Mean residual life; Variance residual life; Residual coefficient of variation.

1. INTRODUCTION

In reliability literature, the additional life time given that the component has survived up to time t , is called the residual life function (RLF) of the component. More specifically, if the random variable X denotes the lifetime of a unit, then the random variable $X_t = X - t | X \geq t$ is called the residual life time.

The mean and the variance of the random variable X_t has received considerable attention in reliability. The concepts of residual or remaining life based on the current age is effectively used to infer properties of the underlying life distributions. The mean residual life function (MRL) has many applications, for example, in insurance, maintenance and product quality control, economics and social studies. The mean residual life function has been studied

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