

## ROLE OF UNBIASED VARIANCE ESTIMATORS IN SYSTEM RELIABILITY WITH APPLICATIONS

M. RENI SAGAYARAJ<sup>1</sup>, A. MERCELINE ANITA<sup>2</sup>  
AND A. CHANDRA BABU<sup>3</sup>

<sup>1 2</sup> Department of Mathematics,  
Sacred Heart College, Vellore Dt., India

<sup>3</sup>Department of Mathematics,  
Noorul Islam University, Kanyakumari Dt., India

### Abstract

The Unbiased Estimators are a highly desirable property of the Estimators which directly calculates the variance of the System Reliability Estimate provided the system can be partitioned into blocks of Series-Parallel structures. This is applicable to any system design that can be decomposed into series-parallel connections as long as component reliability estimates are mutually independent. Biased Estimators can be accurate, but their use can also lead to undesirable risk, particularly when the actual variance is high. This paper aims to propose an analytical approach to some mixed configuration models in order to estimate their unbiased variance of the System Reliability Estimate based on the point estimates of the component reliability estimates. A comparison study of the Variance Estimates based on the biased and unbiased nature of the systems and components have been made and it clearly reveals that to a system, the variance estimate of the System Reliability Estimate mainly rely on the unbiased nature of the components irrespective of the system.

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