

Reliability Analysis of a Series System with Weibull Lifetime Components

Tsai-Hung Fan

Graduate Institute of Statistics
National Central University
300 Jhongda Rd, Jhongli
Taiwan

thfan@stat.ncu.edu.tw

Wei-Heng Huang

Graduate Institute of Statistics
National Central University
300 Jhongda Rd, Jhongli
Taiwan

awei86@msn.com

N. Balakrishnan

Dept of Mathematics and Statistics
McMaster University
Hamilton, Ontario
Canada

bala@univmail.cis.mcmaster.ca

Abstract

In a series system, the system fails if any of the components fails. However, each component may have different life time distribution and in practice, it may not be observed which component causes the failure. This paper considers a life test in a series system of m components with Weibull failure time distributions when only the system failure times are collected. The maximum likelihood estimators and the Fisher information matrix of the parameters of the life time distribution of each component are derived via EM algorithm. Asymptotic inference of the parameters and the reliability function are presented based on the maximum likelihood method.