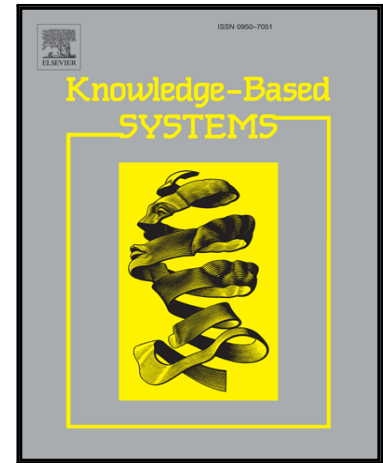


Accepted Manuscript

Importance Index of Components in Uncertain Random Systems

Rong Gao, Kai Yao

PII: S0950-7051(16)30209-X
DOI: [10.1016/j.knosys.2016.07.006](https://doi.org/10.1016/j.knosys.2016.07.006)
Reference: KNOSYS 3594



To appear in: *Knowledge-Based Systems*

Received date: 18 February 2016
Revised date: 13 May 2016
Accepted date: 3 July 2016

Please cite this article as: Rong Gao, Kai Yao, Importance Index of Components in Uncertain Random Systems, *Knowledge-Based Systems* (2016), doi: [10.1016/j.knosys.2016.07.006](https://doi.org/10.1016/j.knosys.2016.07.006)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Importance Index of Components in Uncertain Random Systems

Rong Gao^{1,*}, Kai Yao²

1. Department of Mathematical Sciences, Tsinghua University, Beijing 100084, China

* Corresponding author: gaor14@mails.tsinghua.edu.cn

2. School of Economics and Management, University of Chinese Academy of Sciences, Beijing 100190, China

yaokai@ucas.ac.cn

Abstract

Importance measure is an index to describe the importance of an individual component or a group of components within a reliability system. Up to now, importance measures for components in stochastic reliability systems have been investigated. And importance index for a component and a group of components in an uncertain reliability system has also been studied. In the real world, components with samples and components without samples always coexist in a complex system which is actually an uncertain random reliability system. For describing the importance extent of an individual component and a group of components in an uncertain random reliability system, this paper aims at introducing a new concept of importance index and presenting some formulas to calculate the importance index. Furthermore, this paper takes several examples including uncertain random series, uncertain random parallel, uncertain random parallel-series, uncertain random series-parallel and uncertain random bridge systems to illustrate how to calculate an importance index.

Keywords: Uncertainty theory; chance theory; system reliability; importance index; uncertain random variable.

1 Introduction

Reliability of a stochastic system appeared in late 1940s and early 1950s. So far, it has been applied in some structure systems such as power systems, transportation systems and communication systems. With the development of system reliability, Birnbaum [2] proposed a concept of importance measure for a component in a coherent stochastic reliability system to describe the importance of an individual component. In reliability engineering, the importance measure is regarded as an index to evaluate the relative importance of an individual component or a group of components within a stochastic reliability system. Birnbaum [2] classified the importance measure of a component in a stochastic system into three types which are structure importance measure depending on the system structure, reliability importance measure depending on system structure and the reliabilities of components, and lifetime importance measure depending on the positions of

Download English Version:

<https://daneshyari.com/en/article/4946548>

Download Persian Version:

<https://daneshyari.com/article/4946548>

[Daneshyari.com](https://daneshyari.com)