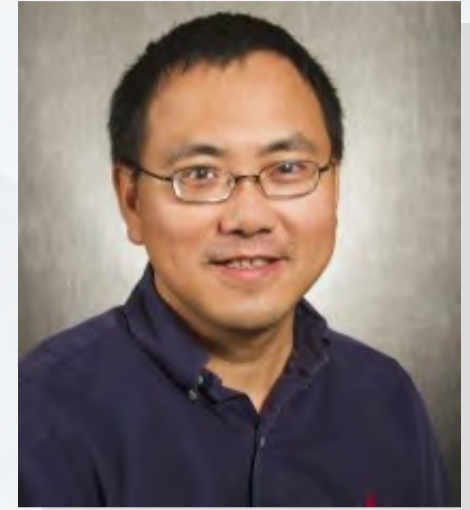


Multivariate stochastic process models for modeling and analyzing degradation data



2 May 2023 (Tue) | 10:30 am - 12:00 nn
YEUNG - P7303

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Abstract

In this talk, I will discuss several multivariate degradation models and the applicable scenarios of these models. We propose a class of hierarchical multivariate Weiner processes, which are able to model the unit-wise heterogeneity, the performance characteristic-wise dependency, and the initiation-growth correlation, which is often seen in degradation data. These stochastic process models incorporate the dual multivariate Gaussian distributed random effects related to the initial values and degradation rates. To infer model parameters, expectation-maximization algorithms and several tools for model validation and selection are developed. Various simulation studies are carried out to assess the performance of the inference method and to compare different models.

About the Speaker

Dr. Rong Pan is an Associate Professor of Industrial Engineering in the Arizona State University (ASU). He is Program Chair of the Data Science, Analytics and Engineering (DSAE) graduate program at ASU. His research interests include failure time data analysis, design of experiments, multivariate statistical process control, time series analysis, and computational Bayesian methods. His research has been supported by NSF, Arizona Science Foundation, Air Force Research Lab, etc. He has published over 90 journal papers and 50+ refereed conference papers. Dr. Pan is a senior member of ASQ, IIE and IEEE, and a lifetime member of SRE. He serves on the editorial boards of Journal of Quality Technology and Quality Engineering.