



DEPARTMENT OF APPLIED MATHEMATICS

應 用 數 學 系

**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Colloquium

**Expectation-maximization and Stochastic Expectation-maximization
Algorithms for System Reliability Data Analysis**

By

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Abstract

In system reliability engineering, systems are made up of different components and these systems can be complex. For various purposes, engineers and researchers are often interested in the lifetime distribution of the system as well as the lifetime distribution of the components which make up the system. In many cases, the lifetimes of a n -component coherent system can be observed, but not the lifetimes of the components. In the recent years, parametric and nonparametric inference for the lifetime distribution of components based on system lifetime lifetimes has been developed. We further investigate the estimation of the parameters in component lifetime distributions based on censored system-level data. Specially, we consider the maximum likelihood estimation and propose alternative computational methods and approximations to the maximum likelihood estimators. Based on the special features of the system lifetime data, we treat the system lifetime data as incomplete data and apply the Expectation-Maximization (EM) algorithm to obtain the MLEs and apply the stochastic EM (SEM) algorithm to approximate the MLEs. Different implementations of the EM and SEM algorithms are proposed and their performances are evaluated. We have shown that the proposed algorithms are feasible and easy to implement for various families of component lifetime distributions.

Date : 25 June, 2018 (Monday)

Time : 10:30a.m. – 11:30a.m.

Venue : TU801, The Hong Kong Polytechnic University

***** ALL ARE WELCOME *****