

## Department of Systems Engineering and Engineering Management

### A Double Billing on Applied Probability in Reliability and Risk Analysis

The SEEM Department will host the following two talks in tandem by two distinguished Applied Probabilists.

#### Seminar Series

Date	23 April 2018 (Monday)
Time	2:15pm - 4:30pm (with a coffee break)
Venue	P7303, 7/F, Yeung Kin Man Academic Building

## Stochastic Processes in Repairable Systems

### Prof. Masaaki Kijima

Dean

School of Informatics and Data Science  
Hiroshima University, Japan

#### Abstract

In the reliability literature, it is often assumed that, upon failure, the system is either replaced by a new one (perfect repair) or repaired minimally (minimal repair). However, the assumption that a repair can be either perfect or minimal may be overly restrictive in practice given the wide variety of maintenance actions. In this talk, I explain reliability models that allow repairs to be more general and discuss the associated stochastic processes. Some results on stochastic comparisons for repair actions are also given.

#### About the Speaker

**Masaaki Kijima** is the dean of School of Informatics and Data Science, Hiroshima University. He graduated from Department of Information Sciences, Tokyo Institute of Technology in 1980, and received PhD from the Simon business school, University of Rochester in 1986. Since then, he has held multiple professorships with the leading economic and mathematical departments, including Tokyo Institute of Technology and Kyoto University. He is the author of two books entitled "Markov Processes for Stochastic Modeling" in 1997 and "Stochastic Processes with Applications to Finance" in 2013, both published

from Chapman & Hall, London. He has published more than 100 papers in international journals specializing applied probability and financial engineering. He had served as a council member of Bachelier Finance Society and associate editors of several international journals of mathematical finance.

## **Some Paradoxical Phenomena in Theory of Probability and their Applications**

**Prof. Asaf Hajiyev**

Institute of Control Systems  
Azerbaijan National Academy of Sciences, Azerbaijan

### **Abstract**

The mathematical models of moving particles, describing a behavior of traffic, communication, queuing and other systems are considered. Motion of particles depends on a distance between them. It is provided that in stationary regime each separately considered particle makes the binomial random walk. This fact allows to calculate some characteristics of traffic systems and predict a traffic jam. In the capacity of an efficiency index in these systems, an average waiting time of particle in the fixed point is taken. A control function is introduced, which means delay of some particles during motion. The class of systems for which introducing of delays can reduce an efficiency index is described. The optimal function minimizing an efficiency index is found. Numerical examples demonstrating results are given.

### **About the Speaker**

**Asaf Hajiyev** is a graduate of Lomonosov Moscow State University (MSU), where he spent more than 15 years from being a student to becoming a professor. In 1980 for contributions to Queuing Theory Hajiyev was awarded Lenin Komsomol Prize in Science and Engineering. For queues with recurrent service. Hajiyev created a control theory, wherein some paradoxes of theory of probability are encountered (K.Szekely, Paradoxes of theory of probability and mathematical statistics. Academia, Budapest, 1980). He constructed a new type of regression models with increasing numbers of unknown parameters, where variances of observation errors unknown and different. Such models are typical for application but their investigation is challenging. He proposed a new method for

constructing a confidence bands for unknown functions in regression models and showed that confident region, constructed by this approach for unknown functions in regression model preferable (more narrow) than confident region constructed by using classical method. A.Hajiyev also created the method for constructing an optimal placement of the letters for different alphabets on a computer keyboard. This approach has been used for an optimal placement of the letters of Azerbaijani alphabet on a computer keyboard and has been adopted as a State Standard Placement by Azerbaijan State Agency on Standardization, Metrology and Patents and is used today in the Windows 8.1 and later versions version. He is co-author of Probability and Statistics Encyclopaedia in Azerbaijani language (1300p.) with translation of all terminologies and conceptions to English and Russian languages, which is used now by scholars in the different fields. A.Hajiyev was visiting professor for various universities (USA - Berkeley, G.Washington, USC; SWEDEN – Chalmers University, Royal Institue of Technology; GERMANY – Hmboldt university, Munich University; China and others). A.Hajiyev is academician of the Azerbaijan National Academy of Sciences, member of TWAS, Foreign member of Mongolian National Academy of Sciences, Honorary member of Academy of Sciences of Moldova, Honorary professor of Chengdu University (China). For 20 years (1995-2015) A.Hajiyev was member of Azerbaijan Parliament, where as a member of the Committee of Science and Education he has brought contribution for development of science and education in independent Azerbaijan. Twice, in 2006-2008 and 2011-2013 he was elected vice-president of Parliamentary Assembly of the Black Sea Economic Cooperation (PABSEC) and since 2015 is Secretary General of PABSEC for the term 5 years with headquarter in Istanbul.

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***All are Welcome!***