香港城市大學
City University of Hong Kong
專業 創新 胸懷全球
Professional · Creative For The World

Hong Kong
Institute for Advanced Study
香港高等研究院

HKIAS Distinguished Lecture

A Mathematical Model of National Sustainability: Where the World is Heading

Professor Yannis A. Phillis

Fellow, AAAS
Fellow, European Academy of Sciences
Member, European Academy of Sciences and Arts
Technical University of Crete, Greece

Date : 29 March 2019 (Friday)
Time : 4:30pm – 6:00pm (*Light refreshments will be served from 4:00pm to 4:30pm*)
Venue: Room 8-210, 8/F, Lau Ming Wai Academic Building
City University of Hong Kong

Abstract

Large scale global problems threaten the welfare of modern societies: species extinction, climate change, poverty, refugee crisis, to name but a few. Future projections of these problems are not optimistic raising the question of sustainability worldwide. To answer this question a definition of sustainability has to be given.

In this talk, a mathematical model will be described that defines and measures sustainability, called SAFE: Sustainability Assessment by Fuzzy Evaluation. SAFE uses data spanning the period 1995 – 2016. In all, 71 time series of basic indicators are used to generate various intermediate sustainability indices and finally an overall index for 161 countries which are ranked accordingly. Data are manipulated statistically to introduce memory, then normalized in [0, 1] and finally passed through a sequential fuzzy reasoning system to obtain the SAFE sustainability index. Missing data are generated through an imputation algorithm. The model includes modules that expose various dynamic features of sustainability worldwide.

A sensitivity analysis reveals those indicators with the highest potential of improving sustainability. Worldwide, renewable energy generation, corruption, forest change, Gross National Income, and Red List Index for species are the most prominent indicators, while in developed countries CO_2 emissions appear first. Indeed, it is well established that climate change, poverty, and species extinction are at the forefront of global problems threatening the global wellbeing. Most countries have made modest progress towards sustainability over 1995-2016. Interestingly, North America shows a small decline. Another counterintuitive result is the relatively low ranking of advanced countries such as South Korea, a fact explained satisfactorily by the model.

Biography

Yannis A. Phillis is Professor Emeritus and former Rector at the Technical University of Crete. He received his diploma in electrical and mechanical engineering from the National Technical University of Athens, Greece, in 1973 and the M.S., Engineer Degree, and Ph.D. degrees from the University of California at Los Angeles (UCLA) in control systems in 1978, 1979, and 1980 respectively. From 1980 to 1986, he was assistant professor at Boston University, Boston, MA. Since 1986, he has been with the School of Production Engineering and Management, Technical University of Crete, Chania, Greece where he was Rector for 12 years and past director of the CAM Laboratory. In 1992 and between 2005 and 2007 he was visiting professor at UCLA's Chemical Engineering Department. In 2008 he was Onassis Foundation Senior Visiting Fellow in the US. In 2013-2014 he was Prometeo Senior Research Fellow in Riobamba, Ecuador. His research interests are in stochastic control, manufacturing, sustainability and climate change.

Online registration: www.cityu.edu.hk/hkias/event

All are welcome

Enquiries:
Tel: 3442 6611
Email: hkias@cityu.edu.hk