Mathematical Problems in Engineering

Special Issue on

Mathematical Models for Dealing with Risk in Engineering

CALL FOR PAPERS

Risk is ubiquitous phenomenon of modern society. The concept of risk is variously understood and used in engineering, economics, earth, and social sciences. Existence of risk arises from a possibility of adverse economic and physical phenomena that can cause damage to business, property, communications networks, and natural environment. In engineering, risk is commonly divided into speculative risk of potential economic losses or gains and nonspeculative or pure risk related to damaging phenomena, such as failures and accidents of physical objects as well as disturbances in computer networks and damage to information systems.

The design of engineering systems usually faces the problem of selecting from among several alternative system solutions. In addition, a system under design can be optimized to meet several often conflicting goals. Formal decision support methods, such as multicriteria decision making (MCDM), decision tree analysis, and multiobjective optimization, can be used to improve engineering systems and decrease risks related to running these systems. The risk is closely associated with uncertainties in future behaviour of engineering systems and their environment. Disappearance of these uncertainties will in fact eliminate the risks. Quantitative measures of the uncertainties just mentioned should be embedded in mathematical models used for decision making (DM). An application of DM methods for design, production, and use of engineering systems will allow application of DM methods.

We invite authors to submit original research articles that seek to demonstrate how formal DM methods can be applied to manage risks related to projects of engineering systems and exploitation of existing systems. The ultimate goal of such DM should be a creation of more sustainable environment in terms of economic effectiveness and safety.

Potential topics include, but are not limited to:

- Concepts and mathematical expressions of risks related to projects of engineering systems and safe exploitation of these systems
- Managing economic risks to engineering projects by means of mathematical DM methods
- DM methods for managing threats to sustainable systems and living environment
- DM methods allowing assessing and assuring safety of vulnerable information systems
- MCDM methods for handling uncertainty and risk analysis in emergency management
- Mathematical models for mining the valued data in engineering projects and information management
- Mathematical methods of DM in fire safety and prevention of industrial accidents
- DM in respect of reliability of engineering objects
- Mathematical methods for selecting tolerable values of risk and solving the problem of "how safe is safe enough"

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Lead Guest Editor
Jurgita Antucheviciene, Vilnius Gediminas Technical University, Vilnius, Lithuania
jurgita.antucheviciene@vgtu.lt

Guest Editors
Gang Kou, Southwestern University of Finance and Economics, Chengdu, China
kougang@swufe.edu.cn

Vida Maliene, Liverpool John Moores University, Liverpool, UK
v.maliene@ljmu.ac.uk

Egidijus R. Vaidogas, Vilnius Gediminas Technical University, Vilnius, Lithuania
egidijus.vaidogas@vgtu.lt

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