

Report

(1) **Name of Lecturer:** Vassili V. Toropov

(2) **Title of Lecturer:** Professor

(3) **Affiliation:** School of Civil Engineering and School of Mechanical Engineering at University of Leeds, UK.

(4) **Short Biography:**

Vassili V. Toropov is a Professor of Aerospace and Structural Engineering in School of Civil Engineering and School of Mechanical Engineering at University of Leeds. He is a top specialist of engineering design optimization and his research interests are in approximation techniques for design optimization, interaction of variable fidelity models, response surface methodology, genetic algorithms, genetic programming, inverse problems, applications to industrial problems, and so on. He is one of the executive committee members of The International Society for Structural and Multidisciplinary Optimization (ISSMO), and he is a co-editor of Structural and Multidisciplinary Optimization Journal (Springer).

(5) **Subject and Schedule of the Lectures:**

This series of lectures is a part of the course "Theory of Engineering Elasto-plasticity" in Department of Mechanical Science and Engineering, Graduate School of Engineering. The lectures in English are intended to give appreciation of a need for design improvement, understanding of what the most useful design optimization techniques are and appreciation of how they can be used to improve designs. Details of the lectures are as follows:

October 15, 2013, 08:45-10:15, 10:30-12:00 and 12:50-14:20

Overview of the design process, basic concept of design optimization, classification of structural optimization problems, formulation of a design improvement problem as an optimization problem, and optimality conditions are explained.

October 16, 2013, 08:45-10:15, 10:30-12:00 and 12:50-14:20

Multi-objective problems, numerical optimization techniques for one-dimensional/multi-dimensional cases, and gradient-free/gradient-based optimization techniques for unconstrained/constrained optimization problems are explained. Genetic algorithm and its application examples are also introduced.

October 18, 2013, 08:45-10:15, 10:30-12:00 and 12:50-14:20

Topology optimization, approximation techniques and stochastic optimization are the main topics. A fully stressed design, topology optimization and its use in structural design are explained. Approximation techniques and design of experiments (DoE) for optimization problems are also explained. Finally stochastic analysis and stochastic design optimization for uncertainties in design are introduced.

(6) **Comments:**

A total of about 20 students participated in this lecture. The lecture must have broadened students' horizons. The students understood that if optimization techniques were used more and more in industries, it would give them a competitive advantage.

