



Optimization with MATLAB – A Hands-on Workshop

Optimization is a procedure where every action is aimed toward best possible solution in terms of ‘SAVING’ of time, cost, resources, or effort. Optimization process is not restricted to engineering application but applicable to all discipline where ubiquitously the best solution to problem is desired. MATLAB/SIMULINK offers toolbox to perform optimization process in an efficient way. Due to diverse nature of the problems and their complexities, more than one optimization process is available to get the best solution.

This workshop first discusses the basic ideology behind the optimization processes and then gives insight to tools available in MATLAB/SIMULINK, followed by the hands-on problem solving session.

COURSE OBJECTIVES

On the successful completion of this course, the participants should be able to

- use MATLAB to formulate the optimization problem,
- use MATLAB to optimize and analyze the problem solution, and
- use SIMULINK to optimize and analyze the problem solution.

COURSE OUTLINE

1. Introduction to Non-linear optimization
 - Constrained, unconstrained optimization
 - Optimization Algorithms
 - Multivariable & Multivariable process
 - Global and local minimization problems
 - Genetic Algorithms, PSO, and SA.
2. MATLAB Optimization
 - Function optimization
 - Optimization toolbox
 - Routines/algorithms
 - Minimization/Maximization problems
 - Multi-objective problems
 - Hands-on examples and problem solving
3. Optimization Simulation with SIMULINK
 - Problem setup
 - Understanding Optimization parameters
 - Running and Simulation
 - PID controller Examples

TARGET AUDIENCE

Undergraduate and Postgraduate students,
Academicians and Researchers,
Engineers and Scientists

VENUE

BL-3-010, Control Systems Laboratory,
College of Engineering,
UNITEN, Putrajaya Campus.

DATE

Thursday November 12, 2015

REGISTRATION

CONTACT: myspsoc@ieee.org

DEADLINE: Wednesday November 04, 2015

FEES

IEEE Member	RM 500
Non-IEEE Member	RM 600
Students (IEEE Member)	RM 400
Students (Non-IEEE Member)	RM 450

*Course materials will be provided
Certificate from IEEE Signal Processing Society (Malaysia Chapter)
Morning/afternoon refreshments and lunch included*

Addendum

A new feature is presented in this workshop on optimization for the participants to embark upon new research areas or add attractive optimization features in their present work. The following three additional optimization cases will be studied and MATLAB programming code will be provided:

1. Heat Transfer optimization
 - (a) Description: Optimization of electronic component location on PCB to reduce Max average temperature
 - (b) Model : 2D Heat transfer Numerical PDE with boundary condition - MATLAB code
 - (c) Related Paper: Convective cooling and optimal placement of electronic components with variable ambient temperature. The linear model by B. Cahlon, I.E. Schochetman and M. Shillor
2. Noise Control optimization
 - (a) Description: Optimization of Environmental Noise control V Barrier Design
 - (b) Model: Sound Pressure level distribution in free space -MATLAB code
 - (c) Related Paper: OPTIMAL NOISE CONTROL ON PLANT USING SIMULATED ANNEALING by Tian-Syung Lan¹ and Min-Chie Chiu²
3. Light Control optimization
 - (a) Description: Indoor light control Optimization
 - (b) Model: luminous intensity distribution - MATAALB code
 - (c) Related Paper: Designing LED array for uniform illumination based on local search algorithm By P. Lei, Q. Wang, H. Zou

SPEAKER'S PROFILE

Farrukh Nagi Dr. is working as professor in Universiti Tenaga Nasional (UNITEN) in area of Mechatronics. He is one of the most senior user of MATLAB and started using MATLAB in 1990 for his Phd work in array signal processing. He is actively involved in MATLAB activities in the country and had conducted numerous hands-on MATLAB/SIMULINK workshops and has supervised numerous undergraduate, postgraduate and phd projects/thesis using MATLAB/SIMULINK. He is an invited MATLAB speaker in seminars and is on panel of judges for TSS Engineering Design Challenge hold by TechSource Sdn Bhd and private training consultants QMS Management Consultant Sdn Bhd and Solution 4U Sdn Bhd.
Website <http://metalab.uniten.edu.my/~farrukh/>