

Practical System Identification using MATLAB Workshop

Introduction

Knowledge about the relationships between the input-output of a particular system - a model - is necessary when there is a need to predict the behaviour of this system under conditions different from those with which the system was tested. Based on the amount of available information, the determination of such a model can be carried-out analytically or numerically. Analytical approaches involve first-principles (basic physical equations), when there is enough a-priori information about the system. Numerical solutions can be obtained through system identification when such information is not available or when the system's behavior is highly non-linear.

Objective & Pedagogy

This course will expose participants to the practical usage (through Matlab) of system identification using a real system (problem-based learning approach). Theoretical developments will be kept to a strict minimum. A parametric modeling will be used as a platform to demonstrate the establishment of the input-output relationship without specific knowledge about the physical equations governing the system (black-box modeling).

Course content

Session 1: Getting started

- a. Presentation of the real system that we will identify during the workshop
- b. Signals & Systems
- c. Dynamic Systems

Session 2: The basics

- a. Frequency-Domain System Identification (SI)
- b. Parametric Techniques

Session 3: Practical System Identification (SI) using linear parametric modeling

- a. The Matlab SI environment
- b. Selection of the model structure
- c. Selection of the model order
- d. Model Validation

Session 4: Introduction to non-linear System Identification

- a. Wiener-Hammerstein model
- b. Comparison between linear and non-linear models



COURSE OBJECTIVES

On the successful completion of this course, participants will be able to use the MATLAB System Identification Toolbox to identify unknown linear dynamic systems.

TARGET AUDIENCE

3rd and 4th year ECE students,
Postgraduate students,
Academicians and researchers,
Engineers and scientists.

VENUE

Computer lab – GP3 107
Curtin University Sarawak Campus
CDT 250, 98009 Miri Sarawak Malaysia

Date : 2nd April, 2015 (Thursday)

Time: 9am to 5pm

REGISTRATION

Students (IEEE Member)	RM 150
Students (Non-IEEE member)	RM 200
IEEE member	RM 250
Non-IEEE member	RM 300

Cash payment can be made on the day of registration.

Register yourself at the link: <http://goo.gl/forms/D0MMrwU0jC>

Contact person: Garenth Lim King Hann (email: gikhann@curtin.edu.my or gikhann@ieee.org)

Deadline: 31st March, 2015

MAIN SPEAKER'S PROFILE

Edmond Zahedi is currently a professor of Biomedical engineering at the Department of Electrical, Electronics and Systems Engineering, National University of Malaysia (UKM). He is a holder of a Diplome d' Ingenieur (Ir.) and Diplome d'Etudes Approfondies - DEA (1985) in Control, Electronics and Informatics as well as a Ph.D. (1989) in Biomedical Engineering. He is also attached to the Electrical School of Engineering, Sharif University of Technology (Iran). His teaching is split between two fields: medical engineering and data communication. His research area has always been medical instrumentation with emphasis on finding efficient ways for healthcare technology assimilation in the context of developing countries. To this end, he chairs the Healthcare Technology Innovation committee at UKM. He routinely uses system identification techniques for characterization of the human vascular system investigated with optoelectronic biosignals. He has successively served as chairman of the 7th Iranian Biomedical Engineering Conference in 1997 and as the scientific chair of the same conference (19th) in 2012. He is a member of the editorial board of the Iranian Journal of Biomedical Engineering (IJBME) and member of the board of the Iranian Society for Biomedical Engineering (ISBME). Prof. Zahedi is a Senior IEEE Member. Prof. Zahedi can be reached at edmond.zahedi@ukm.edu.my and zahedi@sharif.edu.

*This event is supported by IEEE-EMBS Malaysia Chapter.
Course materials and morning/afternoon refreshments and lunch included.*



SECOND SPEAKER'S PROFILE

Alpha Agape Gopalai is presently a staff member in the Department of Mechatronics at Monash University Malaysia. He graduated with a PhD in Engineering Science from Monash University in 2012, specializing in biomechanics. His area of expertise and research interest involves the design of intelligent/ autonomous systems particularly for the use of clinical/ sports biomechanics. He is also actively involved in related research areas such as motion analysis, wired/wireless instrumentation, signal processing, artificial intelligence and smart systems. Alpha first joined IEEE in 2006 as a student member and has been actively involved in IEEE since, holding responsibilities at various capacities. He has been serving in EMBS Malaysia chapter as a committee member since 2013 and was recently appointed to the IEEE TEMS YP Education committee setup to help provide YPs in IEEE with professional development support.

THIRD SPEAKER'S PROFILE

Aws Zuhair is a holder Bachelor in Computer and Software Engineering (2007) and Master of Communication and Computer Engineering (2015). He is currently preparing for PhD. the Department of Electrical, Electronics and Systems Engineering, National University of Malaysia (UKM). His research area has always been Signal processing for healthcare technology. He routinely uses system identification techniques for characterization of the human vascular system investigated with optoelectronic Bio-signals. Aws is currently an IEEE Member.