

## Customised MATLAB® Training

MATLAB® training courses are available from a variety of MATLAB®-related suppliers and several universities. It can be difficult on a general course, with a large number of people of varying interests and widely differing backgrounds and experience, to acquire just the right amount of experience with the required amount of help.

Customised intensive courses with small numbers of active participants enable the training to be tailored to individual and group needs. A minimum of one presenter/trainer for every 5-6 attendees enables close support and back-up when becoming familiar with new software.

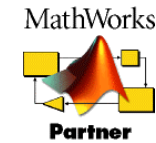
## MATLAB®

MATLAB® continues its spectacular growth in popularity within industry and universities world-wide as the standard tool for a wide range of engineering calculations. MATLAB® is now the de-facto standard computational and visualisation tool for practising and student engineers in electrical, mechanical and control engineering. Although it is less well known amongst Chemical Engineers, MATLAB® has a great deal to offer users in the Process Industries.

The popularity of MATLAB® comes from its ease of use for interactive calculation, engineering design and graphical presentation. MATLAB®'s very high-level programming language (a single Matlab statement can replace tens of lines of FORTRAN or C code) and the openness and extendibility of its powerful basic features has encouraged the development of many optional calculation Toolboxes, as well as 3<sup>rd</sup>-party products and end-user applications. These have extended the use of MATLAB® to all branches of engineering, and into new areas, including financial analysis.

SIMULINK® is a popular block-structured dynamic simulation tool, fully integrated into MATLAB®, which is of growing popularity for process simulation and controllability analysis.

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**Kelvin Hales Associates Ltd.**

# *INTRODUCTION TO* **MATLAB®** *and* **SIMULINK®** *for Engineers in XX Xxx*

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*A two-day course to be held on  
May 20/21<sup>st</sup>*

*at*

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## Course Synopsis

This 2-day course is tailored to the specific needs of XX Xxxl and the individual Engineers who will be attending. The structure and content of the course is based on discussion of both course content and timetable with XX representatives and potential attendees.

The purpose of this course is to give an intensive introductory training in MATLAB® and SIMULINK® for a small number of Engineers and give them, through hands-on experience, the desire and confidence to start using MATLAB® straight away in their work.

The course will include introductions to some of the relevant Toolboxes available for MATLAB®, and the back-up resources available on the Internet through the MATLAB® Newsnet news group and The Math Works own MATLAB® and Connections Web sites.

All course modules will combine presentations and demonstrations with practical exercises.

## Presenter

Kelvin Hales KHACE Consulting Engineers

## Programme

### *Tuesday 20th May*

- 09:30 Coffee, Welcome & Course Overview**
- 10:00 Matlab® Overview**  
Where MATLAB® comes from. What it is. Why it is so popular: What people use it for.
- 10:30-11:30 Getting Started with Matlab**  
Starting and using MATLAB®. Understanding how MATLAB® works. Doing Calculations. Exploiting matrix maths. Understanding Functions. Tips for time and effort saving.
- 11:30-11:45 Coffee**
- 11:45-13:00 Customising MATLAB®**  
Building, handling and running scripts, functions, m-files and simple programming.
- 13:00-13:45 Lunch**
- 14:00-15:00 Extending Matlab®**  
The concept of Toolboxes. MATLAB® as a calculating Engine. Interfacing with other programs, inc. Word and Excel
- 15:00-15:15 Tea/Coffee**
- 15:15-16:00 Toolbox Examples**  
Signal Processing. The Control System Toolbox. The System Identification Toolbox
- 16:00-16:45 Practical Exercise**  
Build & test a Control Valve Model.

### *Wednesday 21st May*

- 09:00 Introduction to SIMULINK®**  
What SIMULINK® is (and isn't). Example applications from the process industries.
- 09:30-10:15 SIMULINK® Case Study**  
Gas compression process. Presentation of building blocks. Block-structured and code-based models.
- 10:15-11:30 Practical Exercise**  
Assemble t and test he gas compression process.
- 11:30-11:45 Coffee**
- 11:45-12:45 Practical Exercise**  
Adapt the Control Valve model of day-1 to function as a SIMULINK® model.. Integrate the Control Valve model and test for controller performance
- 12:45-13:30 Lunch**
- 13:45-15:00 Controllability analysis**  
Obtain linearised model of compression plant and use control system tools to tune the performance control.
- 15:00-15:15 Tea/Coffee**
- 16:00-16:45 MATLAB® Resources**  
The Math Work's Web site and Internet resources for MATLAB® users. 3<sup>rd</sup>-party products
- 15:15-16:00 MATLAB®'s Advanced Features**  
Introduction to MATLAB®'s Graphical user Interface capability.