Training Content

DIgSILENT Simulation Language (DSL)

DAY 1

MODULE 1: Dynamic Modelling Approach in *PowerFactory*

Dynamic Modelling Approach in *PowerFactory* 1/2 h

Fundamentals. Dynamic modelling in practice.

Exercise: Dynamic Modelling Approach 1/2 h

Identify and familiarise with dynamic controls and connection patterns associated to grid elements.

Dynamic Modelling Handling 1/4 h

Model type/elements handling. Identification of DSL model and Composite model.

Exercise: Include Dynamic Models in a Network 1/4 h

Definition of dynamic models from standard model definitions and composite models.

Coffee break

MODULE 2: Dynamic Modelling Concepts

Dynamic Modelling Concepts 1/2 h

Interpret and visualise a functional block diagram. Identify the transfer function in a block diagram.

Exercise: Interpret a Block Diagram 1/4 h

Investigate a block diagram.

MODULE 3: Introduction to DSL and Graphical Modelling

Introduction to DSL and Graphical Modelling 3/4 h

Implementation of models via graphical interface. General considerations of DSL.

Q&A session

Lunch break

Exercise: Model Definition of a Voltage Controller 1/2 h

Usage of the standard macros to build a block diagram to represent an excitation system. Definition of a frame diagram.

Dynamic Model Initialisation 1/2 h

Initialisation concept and procedure. Dynamic model definition: DSL model and composite model.

Exercise: Initialisation of the Voltage Controller Model 1/2 h

Definition of the initial conditions for the excitation system.

Coffee break

Composite Frame Implementation 1/4 h

Definition of composite frame. Identification of signal names in a composite frame.

Implementation of the Voltage Controller Model and Test 3/4 h

Define the composite model and test the voltage controller.

MODULE 4: Dynamic Model Templates

Dynamic Model Templates 1/4 h

Packing and re-using models. Template definition.

Exercise: Define and Use a Generator Set Template 1/4 h

Define a template for a generator set and applying it.

Q&A session

DAY 2

MODULE 5: DSL Syntax and Transfer Function Macro

DSL Syntax and Transfer Function Macro 1/2 h

DSL syntax and coding. DSL standard and special functions. Write transfer function using DSL code.

Exercise: Implement a Transfer Function Macro 1/2 h

Create a macro and familiarise with DSL coding.

Coffee break

MODULE 6: Dynamic Modelling of Generator Controls in *PowerFactory*

Exercise: Complete Plant Control Model 1 1/2 h

Use graphical interface and DSL coding. Implement a complete controller for a synchronous generator.

Q&A session

Lunch break

Continuation Exercise: Complete Plant Control Model 1 1/2 h

Find the initial conditions for the different models and test.

Coffee break

MODULE 7: Dynamic Modelling Auxiliary Elements and DSL Features

Dynamic Modelling Auxiliary Elements and DSL Features — ½ h

Usage of station measurement elements. DSL event function. Special frame features.

Exercise: Simple Undervoltage Relay — ½ h

Implement an undervoltage load-shedding relay using DSL and test it. Usage of the special event function.

MODULE 8: Additional Exercises

Optional Exercises — 1 h

Modelling, initialisation and test of the following models:

- Dynamic Load Model
- Switched Shunts
- Simple PV Plant Model
- Fixed Speed Induction Generator (FSIG) Model

Q&A session

Time Schedule (Central European Time)

	Time
First 90 minutes block	9:00
Coffee break	10:30
Second 90 minutes block	10:45
Q&A session	12:15
Lunch break	12:30
Third 90 minutes block	13:30
Coffee break	15:00
Fourth 90 minutes block	15:15
Q&A session	16:45
End of the training day	17:00

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