Overview of OpenModelica

Spoken Tutorial Project
http://spoken-tutorial.org
National Mission on Education through ICT
http://sakshat.ac.in

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Learning Objectives

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In this tutorial, we will learn,

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In this tutorial, we will learn,

- **About OpenModelica**

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In this tutorial, we will learn,

- **About OpenModelica**
- **About Modeling & Simulation**

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In this tutorial, we will learn,

- **About OpenModelica**
- **About Modeling & Simulation**
- **Subsystems of OpenModelica Enironment**

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In this tutorial, we will learn,

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- **About Modeling & Simulation**
- **Subsystems of OpenModelica Enironment**
- **Features of OpenModelica**

Learning Objectives

In this tutorial, we will learn,

- **About OpenModelica**
- **About Modeling & Simulation**
- **Subsystems of OpenModelica Enironment**
- **Features of OpenModelica**
- **Content available in various tutorials under this series**

System Requirement

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- **OpenModelica v 1.12.0**

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- **OpenModelica v 1.12.0**
- **Ubuntu Linux 16.04**

What is OpenModelica?

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- **Open-source modeling and simulation environment**

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- **Open-source modeling and simulation environment**
- **Object-oriented, multi-domain modeling language**

What is OpenModelica?

- **Open-source modeling and simulation environment**
- **Object-oriented, multi-domain modeling language**
- **Intended for both industrial and academic purposes**

Commercial Modeling & Simulation Tools

Commercial Modeling & Simulation Tools

- **Dymola**

Commercial Modeling & Simulation Tools

- **Dymola**
- **COMSOL Multiphysics**

Commercial Modeling & Simulation Tools

- **Dymola**
- **COMSOL Multiphysics**
- **Simulink**

What is Modeling?

What is Modeling?

- **Translating the actual process behavior into mathematical expressions is called Modeling**

What is Simulation?

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- **Simulation** is the process of using a model to study the behavior and performance of an actual or theoretical system

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- **Simulation is the process of using a model to study the behavior and performance of an actual or theoretical system**
- **It allows evaluating a model to optimize system performance**

What is Simulation?

- **Simulation** is the process of using a model to study the behavior and performance of an actual or theoretical system
- It allows evaluating a model to optimize system performance
- to make predictions about a real system

Subsystems of OpenModelica Environment

Subsystems of OpenModelica Environment

- **OpenModelica has number of subsystems integrated in its environment**

Subsystems of OpenModelica Environment

- **OpenModelica has number of subsystems integrated in its environment**
- **Few of important subsystems are**

Subsystems of OpenModelica Environment

Subsystems of OpenModelica Environment

- **OMNotebook: A lightweight notebook editor, compared to more advanced Mathematica extension**

Subsystems of OpenModelica Environment

- **OMNotebook: A lightweight notebook editor, compared to more advanced Mathematica extension**
- **OMEdit: A graphical connection editor, for component based model design**

Subsystems of OpenModelica Environment

Subsystems of OpenModelica Environment

- **OMOptim: Extends the capabilities of OpenModelica towards design optimization**

Subsystems of OpenModelica Environment

- **OMOptim: Extends the capabilities of OpenModelica towards design optimization**
- **OMShell: Interactive command line session handler for Modelica scripting**

Features of OpenModelica

Features of OpenModelica

- **It is completely free**

Features of OpenModelica

- **It is completely free**
- **It has excellent solvers**

Features of OpenModelica

- **It is completely free**
- **It has excellent solvers**
- **It is an equation oriented environment**

Features of OpenModelica

- It is completely free
- It has excellent solvers
- It is an equation oriented environment
- It has brilliant capability to solve Ordinary Differential Equations

Spoken Tutorial: Introduction to OMEdit

Explains,

Spoken Tutorial: Introduction to OMEdit

Explains,

- **About different tools & icons**

Spoken Tutorial: Introduction to OMEdit

Explains,

- **About different tools & icons**
- **How to open a class from Libraries Browser**

Spoken Tutorial: Introduction to OMEdit

Explains,

- **About different tools & icons**
- **How to open a class from Libraries Browser**
- **Use of Simulate & Re-simulate button**

Spoken Tutorial: Examples through OMEdit

Explain how to,

Spoken Tutorial: Examples through OMEdit

Explain how to,

- **Simulate existing Modelica library examples**

Spoken Tutorial: OpenModelica Connectors

Explain how to,

Spoken Tutorial: OpenModelica Connectors

Explain how to,

- **Drag and drop different classes**

Spoken Tutorial: OpenModelica Connectors

Explain how to,

- **Drag and drop different classes**
- **Connect them to build a system**

Spoken Tutorial: Developing an equation based model

Explain how to,

Spoken Tutorial: Developing an equation based model

Explain how to,

- **Create a textual model in OMEdit and simulate it**

Spoken Tutorial: Control flow and Event handling

Explain how to,

Spoken Tutorial: Control flow and Event handling

Explain how to,

- **Use if-else statement**

Spoken Tutorial: Control flow and Event handling

Explain how to,

- **Use if-else statement**
- **when statement**

Spoken Tutorial: Control flow and Event handling

Explain how to,

- **Use if-else statement**
- **when statement**
- **Handle time & state events**

Spoken Tutorial: Functions and Types

Explain how to,

Spoken Tutorial: Functions and Types

Explain how to,

- **Define function**

Spoken Tutorial: Functions and Types

Explain how to,

- **Define function**
- **Type and use algorithm**

Spoken Tutorial: Arrays in Modelica

Explain how to,

Spoken Tutorial: Arrays in Modelica

Explain how to,

- **Declare array variables**

Spoken Tutorial: Arrays in Modelica

Explain how to,

- **Declare array variables**
- **Construct arrays**

Spoken Tutorial: Arrays in Modelica

Explain how to,

- **Declare array variables**
- **Construct arrays**
- **Use for and while loops**

Spoken Tutorial: Arrays in Modelica

Explain how to,

- **Declare array variables**
- **Construct arrays**
- **Use for and while loops**
- **Use OMShell**

Spoken Tutorial: Array Functions and Operations

Explain how to,

Spoken Tutorial: Array Functions and Operations

Explain how to,

- **Use array construction functions**

Spoken Tutorial: Array Functions and Operations

Explain how to,

- **Use array construction functions**
- **Array conversion functions**

Spoken Tutorial: Array Functions and Operations

Explain how to,

- **Use array construction functions**
- **Array conversion functions**
- **Perform arithmetic operations on vectors & matrices**

Spoken Tutorial: Modelica Packages

Explain how to,

Spoken Tutorial: Modelica Packages

Explain how to,

- **Create a package**

Spoken Tutorial: Modelica Packages

Explain how to,

- **Create a package**
- **Import a package**

Spoken Tutorial: Annotations in Modelica

Explain how to,

Spoken Tutorial: Annotations in Modelica

Explain how to,

- **Specify an annotation**

Spoken Tutorial: Annotations in Modelica

Explain how to,

- **Specify an annotation**
- **Define a record**

Spoken Tutorial: Icon and Diagram Views

Explain how to,

Spoken Tutorial: Icon and Diagram Views

Explain how to,

- **Specify icon and diagram views**

Spoken Tutorial: Icon and Diagram Views

Explain how to,

- **Specify icon and diagram views**
- **Insert shapes in icon and diagram view**

Spoken Tutorial: Component oriented modeling

Explain how to,

Spoken Tutorial: Component oriented modeling

Explain how to,

- **Instantiate a model**

Spoken Tutorial: Component oriented modeling

Explain how to,

- **Instantiate a model**
- **Define connector classes**

Spoken Tutorial: Block component modeling

Explain how to,

Spoken Tutorial: Block component modeling

Explain how to,

- **Use MISO block**

Spoken Tutorial: Block component modeling

Explain how to,

- **Use MISO block**
- **Define connectors**

Spoken Tutorial: Block component modeling

Explain how to,

- **Use MISO block**
- **Define connectors**
- **Instantiate functions**

Summary

We have learnt,

- About Modeling & Simulation
- Subsystems of OpenModelica Enironment
- Features of OpenModelica
- Content available in various tutorials under this series

About the Spoken Tutorial Project

- **Watch the video available at http://spoken-tutorial.org /What_is_a_Spoken_Tutorial**
- **It summarises the Spoken Tutorial project**

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Spoken Tutorial Workshops

The Spoken Tutorial Project Team,

- **Conducts workshops using spoken tutorials**
- **Gives certificates to those who pass an online test**
- **For more details, please write to contact@spoken-tutorial.org**

Forum for specific questions

- Do you have questions in this Spoken Tutorial?
- Please visit http://forums.spoken-tutorial.org
- Choose the minute and second where you have the question
- Explain your question briefly
- Someone from the FOSSEE team will answer them

Forum for specific questions

- **The Spoken Tutorial forum is for specific questions on this tutorial**
- **Please do not post unrelated and general questions on them**
- **This will help reduce the clutter**
- **With less clutter, we can use this discussion as intructional material**

Textbook Companion Project

- **The FOSSEE team coordinates coding of solved examples of popular books**
- **We give honorarium and certificates for those who do this**
- **For more details, please visit this site http://om.fossee.in/textbook-companion-project**

Lab Migration Project

- **The FOSSEE team helps migrate commercial simulator labs to OpenModelica**
- **We give honorarium and certificates for those who do this**
- **For more details, please visit this site http://om.fossee.in/lab-migration-project**

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Thanks

- **Thanks for joining**