Lab Exercise 13- Introduction to OMNotebook – Creating and Simulating a Modelica Model

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LAB TITLE

Introduction to OMNotebook – Creating and Simulating a Modelica Model

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1. Aim

To understand the basic usage of OMNotebook and simulate a simple Modelica model inside it.

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2. Software Required

• OpenModelica installed
• OMNotebook application

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3. Objective

Students will:

• Create a new OMNotebook document
• Write text and Modelica code
• Simulate a simple model
• View simulation results

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4. Theory

OMNotebook is an interactive notebook environment in OpenModelica that allows:

• Writing documentation (text cells)

• Writing Modelica code (input cells)

• Executing commands

• Viewing output and plots

It is useful for:

• Teaching

• Lab documentation

• Experiment recording

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5. Procedure

Step 1: Open OMNotebook

Go to:

Start Menu → OpenModelica → OMNotebook

Step 2: Create New Notebook

File → New

Save as:

```
OMNotebook_Lab1.onb
```

Step 3: Add Text Cell

Click:

Insert → Text Cell

Write:

```
Experiment 1: Simple Mass-Spring System
This experiment demonstrates simulation using OMNotebook.
```

Step 4: Insert Input Cell (Model Code)

Insert → Input Cell

Write:

```
model SimpleMassSpring
  parameter Real m = 1;
  parameter Real k = 10;

  Real x(start=0.1);
  Real v(start=0);

equation
  der(x) = v;
  m*der(v) + k*x = 0;
end SimpleMassSpring;
```

Click Evaluate Cell.

Step 5: Simulate Model

Insert another Input Cell:

```
simulate(SimpleMassSpring, stopTime=10);
```

Evaluate cell.

Step 6: Plot Results

Insert another Input Cell:

```
plot(x);
```

Evaluate.

A plot window will appear showing oscillation.

You can also plot multiple variables:

```
plot({x,v});
```

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6. Expected Results

- Model compiles successfully
- Simulation runs for 10 seconds

- Displacement shows oscillatory motion
- Velocity graph is sinusoidal