**CENTURION UNIVERSITY OF TECHNOLOGY AND MANAGEMENTS**



**Assignments**

Course Title: System Integration with Dymola

Course Code: CUTM1022 (0-0-2)

**Submitted to:**

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*School of Engineering & Technology, Bhubaneswar*

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Branch: B-Tech in Computer Science and Engineering’s

Semester: 4th Sem

Section: C

**Experiment No.: 1**

To measure the current of DC (Direct Connection) and AC (Alternative Current) connections.

**Requirements:**

OpenModelica software

**Procedure:**

***DC Current Measurement***

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface, application

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

After that I connected the connection between the positive end of the resistor and constanttvoltage, then connected the connection between the negative end of the resistor and constantvoltage.after that connected the connection between ground and negative connection of constantvoltage.

Graphical user interface, text, application, email

Description automatically generatedDiagram, schematic

Description automatically generatedAdd some information of the modeling

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_1DC

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {0, 62}, extent = {{-18, -18}, {18, 18}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {1, -77}, extent = {{-17, -17}, {17, 17}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.ConstantVoltage constantVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-64, 0}, extent = {{-16, -16}, {16, 16}}, rotation = -90)));

equation

connect(constantVoltage.n, ground.p) annotation(

Line(points = {{-64, -16}, {-64, -60}, {2, -60}}, color = {0, 0, 255}));

connect(constantVoltage.n, resistor.n) annotation(

Line(points = {{-64, -16}, {-64, -40}, {40, -40}, {40, 62}, {18, 62}}, color = {0, 0, 255}));

connect(constantVoltage.p, resistor.p) annotation(

Line(points = {{-64, 16}, {-64, 62}, {-18, 62}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><!--StartFragment--><span style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In this DC (Direct Current) connection, we have taken</span><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\"><br></div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">V=100V</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">R=10ohm</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">I=10A</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\"><br></div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In my setup, I took the following models</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">1. Resistor</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">2. sine voltage</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">3. Ground</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">I connected the connection between the positive end of the resistor and constantvoltage, then connected the connection between the negative end of the resistor and constantvoltage.after that connected the connection between ground and negative connection of constantvoltage.</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">After the finishing of modelling then save it into your system and go for simulation.</div><!--EndFragment--></body></html>"));

Graphical user interface, text, application

Description automatically generatedend Assignment\_1DC;

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Graphical user interface, application

Description automatically generated

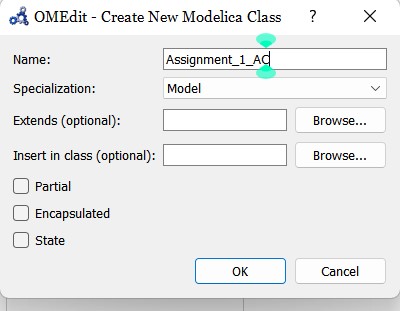
***AC Current Measurement***

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok



Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

After that I connected the connection between the positive end of the resistor and sinevoltage, then connected the connection between the negative end of the resistor and sinevoltage.after that connected the connection between ground and negative connection of sinevoltage.

Add some information of the modeling

Graphical user interface, text, application, email

Description automatically generatedDiagram

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_1\_AC

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {-1, 65}, extent = {{-17, -17}, {17, 17}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.SineVoltage sineVoltage(V = 100, f = 50) annotation(

Placement(visible = true, transformation(origin = {-65, -1}, extent = {{-19, -19}, {19, 19}}, rotation = -90)));

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {-11, -67}, extent = {{-15, -15}, {15, 15}}, rotation = 0)));

equation

connect(sineVoltage.p, resistor.p) annotation(

Line(points = {{-64, 18}, {-66, 18}, {-66, 66}, {-18, 66}}, color = {0, 0, 255}));

connect(sineVoltage.n, resistor.n) annotation(

Line(points = {{-64, -20}, {-64, -28}, {36, -28}, {36, 66}, {16, 66}}, color = {0, 0, 255}));

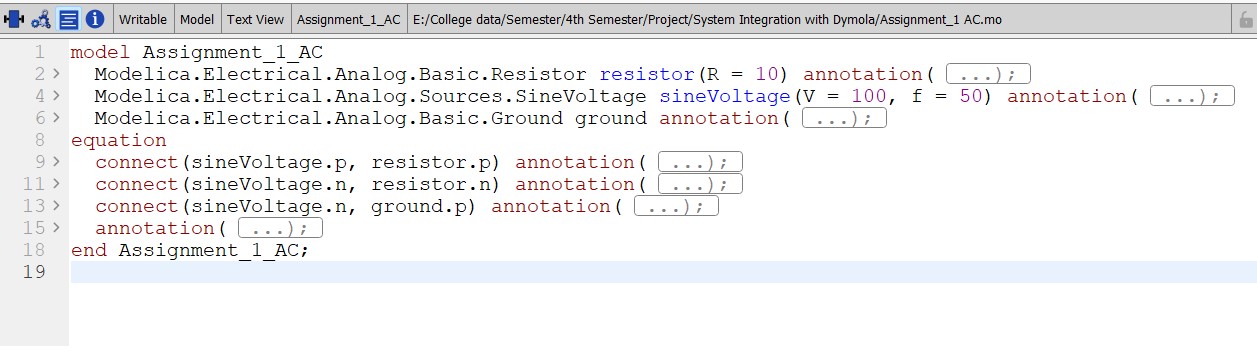
connect(sineVoltage.n, ground.p) annotation(

Line(points = {{-64, -20}, {-64, -52}, {-10, -52}}, color = {0, 0, 255}));

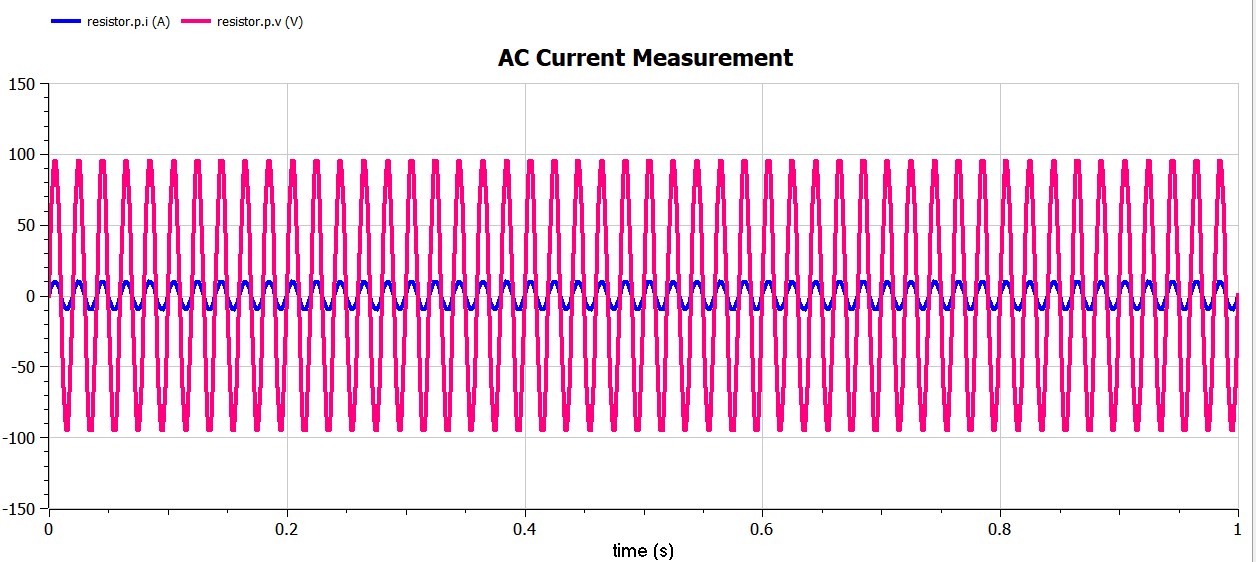
annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><!--StartFragment--><span style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In this AC (Alternative Current) connection, we have taken</span><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\"><br></div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">V=100V</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">R=10ohm</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">I=10A</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">f=50Hz</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\"><br></div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In my setup, I took the following models</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">1. Resistor</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">2. sine voltage</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">3. Ground</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">I connected the connection between the positive end of the resistor and sinetvoltage, then connected the connection between the negative end of the resistor and sinevoltage.after that connected the connection between ground and negative connection of sinevoltage.</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">After the finishing of modelling then save it into your system and go for simulation.</div><!--EndFragment--></body></html>"));

end Assignment\_1\_AC;

Step 6: After the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.



Chart, line chart

Description automatically generated

**Experiment No.: 2**

To measure the current in rampVoltage.

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

 I connected the connection between the positive terminal of resistor and rampVoltage, then connected the connection between negative terminal of rampVoltage to the ground. Finnaly connected the connection between negative terminal of the resistor to the ground.

Add some information of the modeling

Graphical user interface, text, application, email

Description automatically generatedA picture containing sky, day

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment2

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {-1.55431e-15, 70}, extent = {{-18, -18}, {18, 18}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {0, -72}, extent = {{-18, -18}, {18, 18}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.RampVoltage rampVoltage(V = 100, duration = 2) annotation(

Placement(visible = true, transformation(origin = {-67, -1}, extent = {{-19, -19}, {19, 19}}, rotation = -90)));

equation

connect(rampVoltage.p, resistor.p) annotation(

Line(points = {{-66, 18}, {-66, 70}, {-18, 70}}, color = {0, 0, 255}));

connect(rampVoltage.n, ground.p) annotation(

Line(points = {{-66, -20}, {-66, -54}, {0, -54}}, color = {0, 0, 255}));

connect(resistor.n, ground.p) annotation(

Line(points = {{18, 70}, {60, 70}, {60, -52}, {0, -52}, {0, -54}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body>In this circuit<div>R=10ohm</div><div>V=100v</div><div>Duration of ramp=2 second<br><div><br></div><div>&nbsp;I have taken the following models:<div>1. Resistor</div><div>2. RampVoltage</div><div>3. Ground</div><div>First I connected the connection between the positive terminal of resistor and rampVoltage, then connected the connection between negative terminal of rampVoltage to the ground. Finnaly connected the connection between negative terminal of the resistor to the ground. After the completion of modeling, go for simulation then ploting.</div></div></div></body></html>"),

Diagram);

end Assignment2;

Graphical user interface, text, application

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 3.1**

Current load to the resistor with Inductor

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

  I connected the connection between the positive terminal of constantVoltage and resistor. then the connection between negative terminal of resistor and positive terminal of inductor, then connection between negative terminal of the inductor and ground, connection between negative terminal of constantvoltaga and ground.

Add some information of the modeling

Diagram, schematic

Description automatically generatedGraphical user interface, text, application, email

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_3of1

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {1, 63}, extent = {{-15, -15}, {15, 15}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Inductor inductor(L = 2) annotation(

Placement(visible = true, transformation(origin = {54, 64}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {0, -50}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.ConstantVoltage constantVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-62, 0}, extent = {{-10, -10}, {10, 10}}, rotation = -90)));

equation

connect(constantVoltage.p, resistor.p) annotation(

Line(points = {{-62, 10}, {-64, 10}, {-64, 64}, {-14, 64}}, color = {0, 0, 255}));

connect(constantVoltage.n, ground.p) annotation(

Line(points = {{-62, -10}, {-62, -40}, {0, -40}}, color = {0, 0, 255}));

connect(resistor.n, inductor.p) annotation(

Line(points = {{16, 64}, {44, 64}}, color = {0, 0, 255}));

connect(inductor.n, ground.p) annotation(

Line(points = {{64, 64}, {80, 64}, {80, -40}, {0, -40}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body>In this RL circuit<div>R=10ohm</div><div>V=100V</div><div>L=2H</div><div>&nbsp;In this RL circuit load to the resistor with inductor, Firstly I connected the connection between the positive terminal of constantVoltage and resistor. then the connection between negative terminal of resistor and positive terminal of inductor, then connection between negative terminal of the inductor and ground, connection between negative terminal of constantvoltaga and ground. Finally check the model, then simulate. after that go for plotting.</div></body></html>"));

end Assignment\_3of1;

Graphical user interface, text, application, Word

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 3.2**

Current load to the resistor with capacitor

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface, text

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

I connected the connection between the positive terminal of constantVoltage and resistor. then the connection between negative terminal of resistor and positive terminal of Capacitor, then connection between negative terminal of the Capacitor and ground, connection between negative terminal of constantvoltaga and ground.

Add some information of the modeling

Graphical user interface, text, application, email

Description automatically generatedDiagram

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_3of2

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {-1, 63}, extent = {{-13, -13}, {13, 13}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Capacitor capacitor(C = 10) annotation(

Placement(visible = true, transformation(origin = {54, 62}, extent = {{-12, -12}, {12, 12}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {1, -51}, extent = {{-11, -11}, {11, 11}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.ConstantVoltage constantVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-60, -2}, extent = {{-12, -12}, {12, 12}}, rotation = -90)));

equation

connect(constantVoltage.p, resistor.p) annotation(

Line(points = {{-60, 10}, {-60, 64}, {-14, 64}}, color = {0, 0, 255}));

connect(constantVoltage.n, ground.p) annotation(

Line(points = {{-60, -14}, {-60, -40}, {2, -40}}, color = {0, 0, 255}));

connect(resistor.n, capacitor.p) annotation(

Line(points = {{12, 64}, {42, 64}, {42, 62}}, color = {0, 0, 255}));

connect(capacitor.n, ground.p) annotation(

Line(points = {{66, 62}, {80, 62}, {80, -40}, {2, -40}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><!--StartFragment--><span style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In this RL circuit</span><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">R=10ohm</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">V=100V</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">C=10F</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">&nbsp;In this RC circuit load to the resistor with inductor, Firstly I connected the connection between the positive terminal of constantVoltage and resistor. then the connection between negative terminal of resistor and positive terminal of Capacitor, then connection between negative terminal of the Capacitor and ground, connection between negative terminal of constantvoltaga and ground. Finally check the model, then simulate. after that go for plotting.</div><!--EndFragment--></body></html>"));

end Assignment\_3of2;

Text

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 3.**

Current load to the resistor with Inductor and capacitor

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

I connected the connection between the positive terminal of constantVoltage and resistor. then the connection between negative terminal of resistor and positive terminal of inductor, then connection between negative terminal of the inductior and positive terminal of capacitor, connection between negative terminal of capacitor to ground, connection between negative terminal of constantVoltage to ground.

Add some information of the modeling

Graphical user interface, text, application

Description automatically generatedDiagram, schematic

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_3of3

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {-49, 63}, extent = {{-11, -11}, {11, 11}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Capacitor capacitor(C = 10) annotation(

Placement(visible = true, transformation(origin = {54, 64}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Inductor inductor(L = 2) annotation(

Placement(visible = true, transformation(origin = {-2, 64}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {0, -46}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.ConstantVoltage constantVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-71, -1}, extent = {{-11, -11}, {11, 11}}, rotation = -90)));

equation

connect(constantVoltage.p, resistor.p) annotation(

Line(points = {{-70, 10}, {-68, 10}, {-68, 64}, {-60, 64}}, color = {0, 0, 255}));

connect(resistor.n, inductor.p) annotation(

Line(points = {{-38, 64}, {-12, 64}}, color = {0, 0, 255}));

connect(inductor.n, capacitor.n) annotation(

Line(points = {{8, 64}, {64, 64}}, color = {0, 0, 255}));

connect(capacitor.n, ground.p) annotation(

Line(points = {{64, 64}, {80, 64}, {80, -36}, {0, -36}}, color = {0, 0, 255}));

connect(constantVoltage.n, ground.p) annotation(

Line(points = {{-70, -12}, {-70, -36}, {0, -36}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><span style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In this RL circuit</span><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">R=10ohm</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">V=100V</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">L=2H</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">C=10F</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">&nbsp;In this RLC circuit load to the resistor with inductor, Firstly I connected the connection between the positive terminal of constantVoltage and resistor. then the connection between negative terminal of resistor and positive terminal of inductor, then connection between negative terminal of the inductior and positive terminal of capacitor, connection between negative terminal of capacitor to ground, connection between negative terminal of constantVoltage to ground. Finally check the model, then simulate. after that go for plotting.</div></body></html>"));

end Assignment\_3of3;

Graphical user interface, text

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 4**

Half-wave Rectifier

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

I connected the connection between the positive terminal of sineVoltage and positive terminal of diode. then the connection between negative terminal of diode to the ground, then connection between negative terminal of the sineVoltage to the ground.

Diagram

Description automatically generatedAdd some information of the modeling

Text, letter

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_4

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {0, -70}, extent = {{-16, -16}, {16, 16}}, rotation = 0)));

Modelica.Electrical.Analog.Semiconductors.Diode diode annotation(

Placement(visible = true, transformation(origin = {1, 61}, extent = {{-19, -19}, {19, 19}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.SineVoltage sineVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-62, -1}, extent = {{-17, -18}, {17, 18}}, rotation = -90)));

equation

connect(sineVoltage.p, diode.p) annotation(

Line(points = {{-62, 16}, {-62, 62}, {-18, 62}}, color = {0, 0, 255}));

connect(diode.n, ground.p) annotation(

Line(points = {{20, 62}, {60, 62}, {60, -54}, {0, -54}}, color = {0, 0, 255}));

connect(sineVoltage.n, ground.p) annotation(

Line(points = {{-62, -18}, {-62, -54}, {0, -54}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><!--StartFragment--><span style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">In half-wave rectifier,</span><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">V=100V</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">Vt=0.04V</div><div style=\"font-family: 'MS Shell Dlg 2'; font-size: 12px;\">&nbsp;In half-wave rectifier, Firstly I connected the connection between the positive terminal of sineVoltage and positive terminal of diode. then the connection between negative terminal of diode to the ground, then connection between negative terminal of the sineVoltage to the ground. Finally check the model, then simulate. after that go for plotting.</div><!--EndFragment--></body></html>"));

end Assignment\_4;

Graphical user interface, application, Word

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 5**

Full-wave Rectifier

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

I connected four diodes in proper way, then connected the connection between diodes and sineVoltage. then the connection between negative terminal of diode to the positive terminal of resistor, then connection between negative terminal of the registor to the positive terminal of diodes, at the end connect the connection between sineVoltage to ground.

Graphical user interface, text, application

Description automatically generatedAdd some information of the modeling

Diagram, schematic

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_5

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {0, -52}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.SineVoltage sineVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-68, -2}, extent = {{-14, -14}, {14, 14}}, rotation = -90)));

Modelica.Electrical.Analog.Semiconductors.Diode diode annotation(

Placement(visible = true, transformation(origin = {-18, 68}, extent = {{-10, -10}, {10, 10}}, rotation = 180)));

Modelica.Electrical.Analog.Semiconductors.Diode diode1 annotation(

Placement(visible = true, transformation(origin = {18, 68}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Semiconductors.Diode diode2 annotation(

Placement(visible = true, transformation(origin = {-18, 40}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Semiconductors.Diode diode3 annotation(

Placement(visible = true, transformation(origin = {18, 40}, extent = {{-10, -10}, {10, 10}}, rotation = 180)));

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {68, 2}, extent = {{-10, -10}, {10, 10}}, rotation = -90)));

equation

connect(diode.p, diode1.p) annotation(

Line(points = {{-8, 68}, {8, 68}}, color = {0, 0, 255}));

connect(diode2.n, diode3.n) annotation(

Line(points = {{-8, 40}, {8, 40}}, color = {0, 0, 255}));

connect(diode.n, diode2.p) annotation(

Line(points = {{-28, 68}, {-28, 40}}, color = {0, 0, 255}));

connect(diode1.n, diode3.p) annotation(

Line(points = {{28, 68}, {28, 40}}, color = {0, 0, 255}));

connect(sineVoltage.p, diode1.n) annotation(

Line(points = {{-68, 12}, {-68, 96}, {28, 96}, {28, 68}}, color = {0, 0, 255}));

connect(sineVoltage.n, diode.n) annotation(

Line(points = {{-68, -16}, {-68, -40}, {-40, -40}, {-40, 68}, {-28, 68}}, color = {0, 0, 255}));

connect(diode3.n, resistor.p) annotation(

Line(points = {{8, 40}, {8, 20}, {68, 20}, {68, 12}}, color = {0, 0, 255}));

connect(diode.p, resistor.n) annotation(

Line(points = {{-8, 68}, {-8, 84}, {48, 84}, {48, -34}, {68, -34}, {68, -8}}, color = {0, 0, 255}));

connect(sineVoltage.n, ground.p) annotation(

Line(points = {{-68, -16}, {-68, -42}, {0, -42}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><!--StartFragment--><span style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">In full-wave rectifier,</span><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">1. Registor</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">2. sineVoltage</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">3. Four diodes</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">4. Ground</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">&nbsp;V=100V</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">Vt=0.04V</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">R=10 ohm</div><div style=\"font-size: 12px; font-family: 'MS Shell Dlg 2';\">&nbsp;In full-wave rectifier, Firstly I connected four diodes in proper way, then connected the connection between diodes and sineVoltage. then the connection between negative terminal of diode to the positive terminal of resistor, then connection between negative terminal of the registor to the positive terminal of diodes, at the end connect the connection between sineVoltage to ground. Finally check the model, then simulate. after that go for plotting.</div><!--EndFragment--></body></html>"));

end Assignment\_5;

Text

Description automatically generated with medium confidence

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 6**

What happens when two diodes are connected with a resistor

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Graphical user interface, text, application

Description automatically generated

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

 i connect the positive terminal of sineVoltage to the diode and positve terminal of resistor to the diode, the connect the negative terminal of sineVoltage to the ground and negative terminal of resistor to the ground.

Add some information of the modeling

Text, letter

Description automatically generatedDiagram

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model Assignment\_6

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {0, -58}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 10) annotation(

Placement(visible = true, transformation(origin = {64, 2}, extent = {{-12, -12}, {12, 12}}, rotation = -90)));

Modelica.Electrical.Analog.Semiconductors.Diode diode annotation(

Placement(visible = true, transformation(origin = {2, 76}, extent = {{-10, -10}, {10, 10}}, rotation = 0)));

Modelica.Electrical.Analog.Semiconductors.Diode diode1 annotation(

Placement(visible = true, transformation(origin = {4, 50}, extent = {{-10, -10}, {10, 10}}, rotation = 180)));

Modelica.Electrical.Analog.Sources.SineVoltage sineVoltage(V = 100) annotation(

Placement(visible = true, transformation(origin = {-63, -1}, extent = {{-13, -13}, {13, 13}}, rotation = -90)));

equation

connect(diode.p, diode1.n) annotation(

Line(points = {{-8, 76}, {-24, 76}, {-24, 50}, {-6, 50}}, color = {0, 0, 255}));

connect(diode.n, diode1.p) annotation(

Line(points = {{12, 76}, {32, 76}, {32, 50}, {14, 50}}, color = {0, 0, 255}));

connect(sineVoltage.p, diode.p) annotation(

Line(points = {{-62, 12}, {-62, 76}, {-8, 76}}, color = {0, 0, 255}));

connect(sineVoltage.n, ground.p) annotation(

Line(points = {{-62, -14}, {-64, -14}, {-64, -48}, {0, -48}}, color = {0, 0, 255}));

connect(diode.n, resistor.p) annotation(

Line(points = {{12, 76}, {64, 76}, {64, 14}}, color = {0, 0, 255}));

connect(resistor.n, ground.p) annotation(

Line(points = {{64, -10}, {64, -48}, {0, -48}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body><div>Requirement for this circuit</div><div>1 AC voltage (sineVoltage)</div><div>2. Resistor</div><div>3. Two diodes</div><div>4. Ground</div><div><br></div>In this Circuit diagram,<div>V=100V</div><div>R=10 ohm</div><div>First i connect the positive terminal of sineVoltage to the diode and positve terminal of resistor to the diode, the connect the negative terminal of sineVoltage to the ground and negative terminal of resistor to the ground. then check it, then go for simulation.</div><div><br></div><div>Theory</div><div><div>The current through both the diodes remain the same and is equal to the total current flowing in the circuit.</div><div>Hence the maximum current that a diode can withstand remains the same and does not change.</div><div>In other words, the current-carrying capacity of the diode does not change.</div></div><div><br></div><div>Diode D1 will be forward biased and diode d2 will be reversed biased.</div></body></html>"));

end Assignment\_6;

Text

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

Chart, line chart

Description automatically generated

**Experiment No.: 7**

Create a DC MOTOR package under that create two models

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Graphical user interface, text

Description automatically generated with medium confidenceStep 2: Click on New Modelica class, give a new Modelica class name, and give the specialization as package then click on ok. Finally a package created

Graphical user interface, application

Description automatically generated

Step 3: Then we have to draw a model

A picture containing text, indoor, tiled

Description automatically generated

Step 4: I have to create a model under the package, so go to the package which you have created, right click on that package and click on New Modelica Class. Then give the model name then specialization as model, then click on ok

Graphical user interface, text, application

Description automatically generatedGraphical user interface

Description automatically generatedGraphical user interface, application

Description automatically generated

Step 5: The I created a model under a package

Diagram

Description automatically generated

Step 6: Then another model I want to create under the last model created, right click on last model, then click on New Modelica Class. Give the model name, give the specialization as model, then click on ok.

Graphical user interface, text

Description automatically generatedGraphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Step 7: Then create a model2

Text, letter

Description automatically generatedDiagram, schematic

Description automatically generated

**Experiment No.: 8**

Create a double pendulum model under single pendulum model

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Step 2: Then we have to draw a model

A picture containing text, toilet, tiled, bathroom

Description automatically generatedGraphical user interface, text, application, email

Description automatically generated

Step 3: Then click on Simulate with animation

Table

Description automatically generated

Chart, box and whisker chart

Description automatically generated

Step 4: Select Isometric, the give the time, then click on play button

Graphical user interface, application, table

Description automatically generatedGraphical user interface, application

Description automatically generated

Chart, line chart

Description automatically generated

Step 5: Observe the pendulum oscillation.

Chart, line chart

Description automatically generated

A picture containing wall, toilet, bathroom, tiled

Description automatically generatedStep 6: Then we have to draw a model

Text, letter

Description automatically generated

Step 7: Then click on Simulate with animation

A picture containing diagram

Description automatically generated

Chart

Description automatically generated

Step 8: Select Isometric, the give the time, then click on play button

Graphical user interface, application, table

Description automatically generatedGraphical user interface, application

Description automatically generated

Chart, line chart

Description automatically generated

Step 9: Observe the pendulum oscillation.

Chart, line chart

Description automatically generated

**Problem No. 1:**

A solenoid with an inductance of 25 mH and resistance of 8Ω are connected to the terminals of a 6-V battery in series. There is also a switch in the circuit.

1. Find the final current in the circuit.
2. Check and verify using Modelica

**Requirements:**

OpenModelica software

**Procedure:**

Step 1: Open Openmodelica connection editor

Graphical user interface, application

Description automatically generated

Graphical user interface

Description automatically generatedStep 2: Click on New Modelica class, give a new Modelica class name, then click on ok

Step 3: Then this type of page will appear

A picture containing white, tub, bath

Description automatically generated

Step 4: Go to Modelica packages, then go to electrical, then analog, then basic, then drag resistor and ground to the modeling field , then choose the constant voltage from source packages.

I connected the connection between positive terminal of ConstantVoltage and registor, the connection between negative terminal of resistor and positive terminal of inductor, then connecton between negative terminal of inductor to the ground, finally connection between negative terminal of constantVoltage to the ground.

Add some information of the modeling

Graphical user interface, text, application, email

Description automatically generatedDiagram, schematic

Description automatically generated

Step 5: After the completion of modeling then save the Modelica file into your pc as .mo extensions, after that go for simulation, when clicking on simulation then compilation occurs, graphical language changes into modelica language.

model problem\_1

Modelica.Electrical.Analog.Basic.Ground ground annotation(

Placement(visible = true, transformation(origin = {-1, -49}, extent = {{-13, -13}, {13, 13}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Resistor resistor(R = 8) annotation(

Placement(visible = true, transformation(origin = {-1, 67}, extent = {{-15, -15}, {15, 15}}, rotation = 0)));

Modelica.Electrical.Analog.Basic.Inductor inductor(L = 0.025) annotation(

Placement(visible = true, transformation(origin = {45, 69}, extent = {{-11, -11}, {11, 11}}, rotation = 0)));

Modelica.Electrical.Analog.Sources.ConstantVoltage constantVoltage(V = 6) annotation(

Placement(visible = true, transformation(origin = {-66, 0}, extent = {{-14, -14}, {14, 14}}, rotation = -90)));

equation

connect(constantVoltage.p, resistor.p) annotation(

Line(points = {{-66, 14}, {-66, 67}, {-16, 67}}, color = {0, 0, 255}));

connect(resistor.n, inductor.p) annotation(

Line(points = {{14, 67}, {24, 67}, {24, 70}, {34, 70}}, color = {0, 0, 255}));

connect(inductor.n, ground.p) annotation(

Line(points = {{56, 70}, {76, 70}, {76, -36}, {0, -36}}, color = {0, 0, 255}));

connect(constantVoltage.n, ground.p) annotation(

Line(points = {{-66, -14}, {-66, -36}, {0, -36}}, color = {0, 0, 255}));

annotation(

uses(Modelica(version = "4.0.0")),

Documentation(info = "<html><head></head><body>In this Solenoid<div>Inductance=L= 25mH= 0.025H</div><div>Resistance=8 ohm</div><div>V=6V</div><div>Simulating time=0.03sec</div><div>In this circuit I connected the connection between positive terminal of ConstantVoltage and registor, the connection between negative terminal of resistor and positive terminal of inductor, then connecton between negative terminal of inductor to the ground, finally connection between negative terminal of constantVoltage to the ground, then go for check, then go for simulating.</div><div><br></div></body></html>"));

end problem\_1;

Graphical user interface, application, Word

Description automatically generated

Step 6:after the compilation it will show you a plotting area where you have to plot, as per your given data you have to simulate.

A picture containing calendar

Description automatically generated

Answer:

1. Final current in the circuit is 0.749949 at 0.03s