BouncingGold

Financial Data

In[18]:=
```
SetDirectory[NotebookDirectory[]]
```
Out[18]=
```
/Users/mario/Dropbox/Systar
```

In[22]:=
```
FileNames[]
```
Out[22]=
```
{BouncingGold.mo, gold-plot-1.png, LinearSliders-Systar-2022.11.27-18h00.nb,
 Reunion-1-2022.11.28-20h30.nb, SystarBook.m, SystarBook.nb,
 Systar-Book.pdf, SystarBook.pdf, Test.nb, TOC.nb}
```

Out[21]=

On commence par importer le modèle :

In[23]:=
```
model = Import["BouncingGold.mo"]
```
Out[23]=

$$x' = f(x, y, t)$$
$$0 = g(x, y, t)$$

BouncingGold

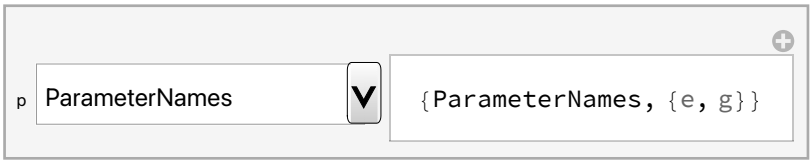
Nous pouvons acceder

In[24]:=
```
modelProperties = model["Properties"]
```

Out[24]=
```
{AlgebraicVariables, Balanced, Children, Components, Connections, Connectors,
 Description, Diagram, DiscreteVariables, Documentation, DocumentationURL,
 Domain, DomainChart, ExtendsModels, GroupedInitialValues, InheritedComponents,
 InheritedConnections, InheritedConnectors, InheritedPlotNames, InheritedPlots,
 InitialEquations, InitialSeedings, InitialValues, InputVariables,
 LocalComponents, LocalConnections, LocalConnectors, LocalPlotNames,
 LocalPlots, ModelicaDisplay, ModelicaIcon, ModelicaString, ModelName,
 ModelsContaining, ModelsExtending, OutputVariables, ParameterNames,
 ParameterValues, Parent, PlotNames, Plots, PropertyAassociation,
 PropertyDataset, Siblings, SimulationModel, SimulationSettings,
 SourceFile, Specialization, StateVariables, Summary, SystemEquations,
 SystemVariables, Thumbnail, TopParameterNames, TopSystemVariables, Version}
```

In[29]:=
```
Manipulate[{p, model[p]}, {p, modelProperties}, ControlPlacement → Left]
```

Out[29]=



Maintenant on peut simuler le modèle:

In[30]:=
```
sim = SystemModelSimulate[model]
```

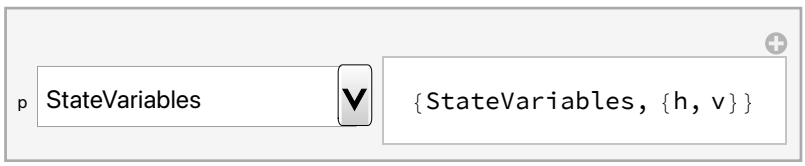
Out[30]=

In[31]:=
```
simulationProperties = sim["Properties"]
```

Out[31]=
```
{BooleanVariables, Descriptions, Diagram, DisplayTimeUnit, DisplayUnits,
 Events, ExitCode, GroupedInitialValues, InitialValues, InputVariables,
 InterpolationOrder, Model, ModelName, NumberOfEvents, OutputVariables,
 ParameterNames, ParameterValues, PlotNames, Plots, Samples,
 SensitivityNames, SensitivityValues, SimulationInterval, SimulationLength,
 StateVariables, Summary, Units, VariableNames, VariableValues}
```

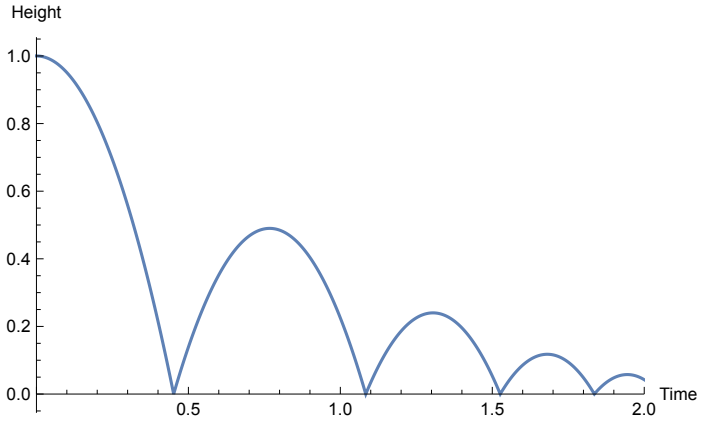
In[32]:=
```
Manipulate[{p, sim[p]}, {p, simulationProperties}, ControlPlacement → Left]
```

Out[32]=



In[35]:=
```
SystemModelPlot[sim, "h",
PlotRange → {{0, 2}, All}, AxesLabel → {"Time", "Height"}]
```

Out[35]=

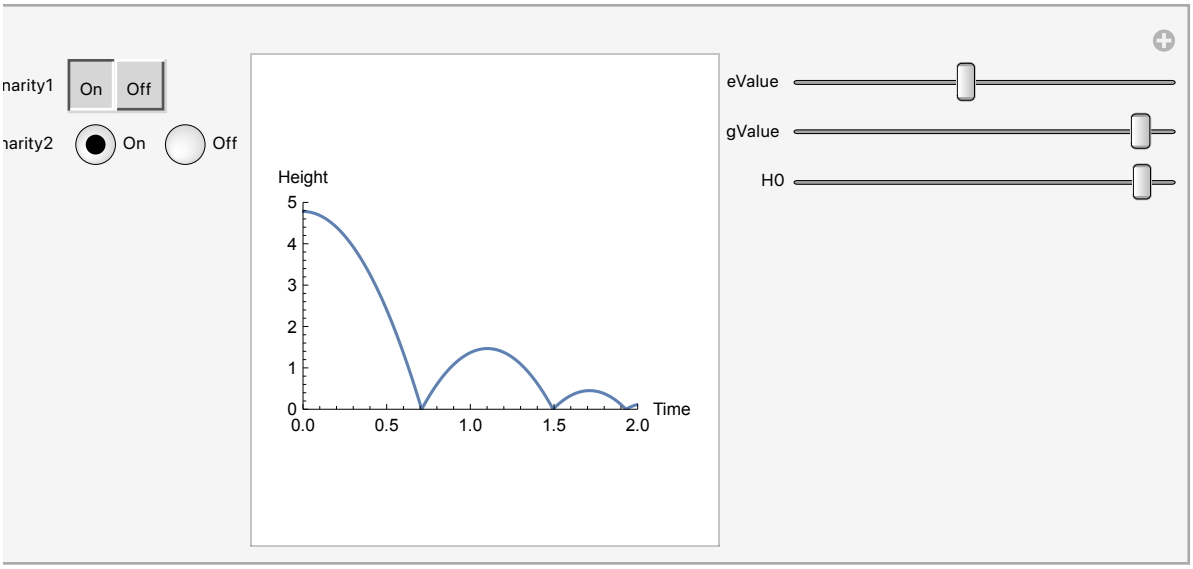


Simulator

In[41]:=
```
simulationForSimulator[eValue_?NumericQ, gValue_?NumericQ, H0_?NumericQ] :=
SystemModelSimulate[model, 2, <|"ParameterValues" → {"e" → eValue, "g" → gValue},
"InitialValues" → {"h" → H0}|>]
```

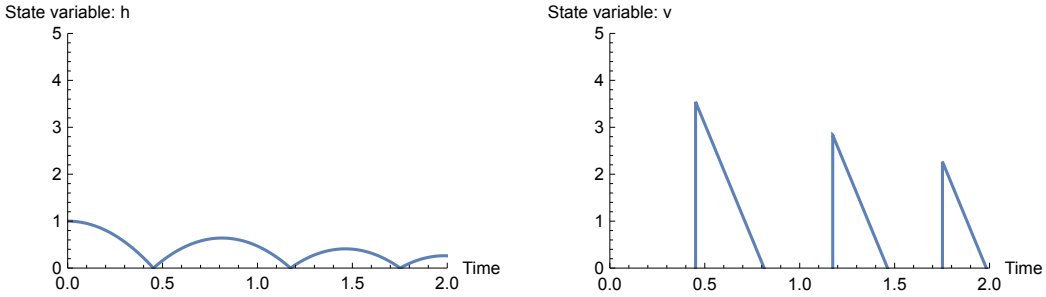
In[58]:=
```
Manipulate[
SystemModelPlot[simulationForSimulator[eValue, gValue, H0],
"h", PlotRange → {{0, 2}, {0, 5}}, AxesLabel → {"Time", "Height"}],
{{eValue, 0.5}, 0.2, 1},
{{gValue, 9.81}, 0.1, 20},
{{H0, 1}, 0.1, 5},
{{Binarity1, "On"}, {"On", "Off"}, SetterBar},
{{Binarity2, "On"}, {"On", "Off"}, RadioButtonBar},
SaveDefinitions → True,
ControlPlacement → {Right, Right, Right, Left, Left}
]
```

Out[58]=



In[64]:=
```
GraphicsRow[
 With[
  {simu = simulationForSimulator[0.8, 9.81, 1]},
  Table[SystemModelPlot[simu, stateVariable, PlotRange → {{0, 2}, {0, 5}},
    AxesLabel → {"Time", "State variable: " <> ToString[stateVariable]}],
   {stateVariable, simu["StateVariables"]}]],
 ImageSize → Large]
```

Out[64]=



In[ ]:=
```
(*Manipulate[
 With[
  {simu=simulationForSimulator[eValue,gValue,H0]},
  Show@Table[SystemModelPlot[simu,stateVariable,
   PlotRange→{{0,2},{-5,5}},PlotStyle→RandomColor[],
   AxesLabel→{"Time","State variable: "<>ToString[stateVariable]}],
  {stateVariable,simu["StateVariables"]}]],
 {{eValue,0.5},0.2,1},
 {{gValue,9.81},0.1,20},
 {{H0,3},0.1,5},
 {{Binarity1,"On"},{"On","Off"},SetterBar},
 {{Binarity2,"On"},{"On","Off"},RadioButtonBar},
 SaveDefinitions→True,
 ControlPlacement→{Right,Right,Right,Left,Left}
 ]*)
```

In[79]:=
```
color["h"] = RGBColor[0.12, 0.68, 0.09];
color["v"] = Red;
```

In[86]:=

```
Manipulate[
 With[
  {simu = simulationForSimulator[eValue, gValue, H0]},
  Show@Table[SystemModelPlot[simu, stateVariable,
    PlotRange → {{0, 2}, All}, PlotStyle → color[stateVariable],
    AxesLabel → {"Time", "State variable: " <> ToString[stateVariable]}],
   {stateVariable, Reverse@simu["StateVariables"]}]],
 {{eValue, 0.5}, 0.2, 1},
 {{gValue, 40}, 0.1, 60},
 {{H0, 6}, 0.1, 50},
 {{Binarity1, "On"}, {"On", "Off"}, SetterBar},
 {{Binarity2, "On"}, {"On", "Off"}, RadioButtonBar},
 SaveDefinitions → True,
 ControlPlacement → {Right, Right, Right, Left, Left}
 ]
```

Out[86]=