Author

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Description

The following script executes a DC/DC boost converter simulation to compare a switch based with approximated mathematical model.

The differential equation for the current

$$\frac{di(t)}{dt} = \frac{1}{L}u_0(t) - \frac{DR_{DS}+R_L}{L}i(t) - (1-D)\frac{1}{L}u_C(t)$$

The differential equation for the voltage

$$\frac{du_C(t)}{dt} = \frac{1}{C}i(t) - \frac{1}{CR}u_C(t)$$

Tidy up workspace

```
clc,clear, close all;
```

System Parameter

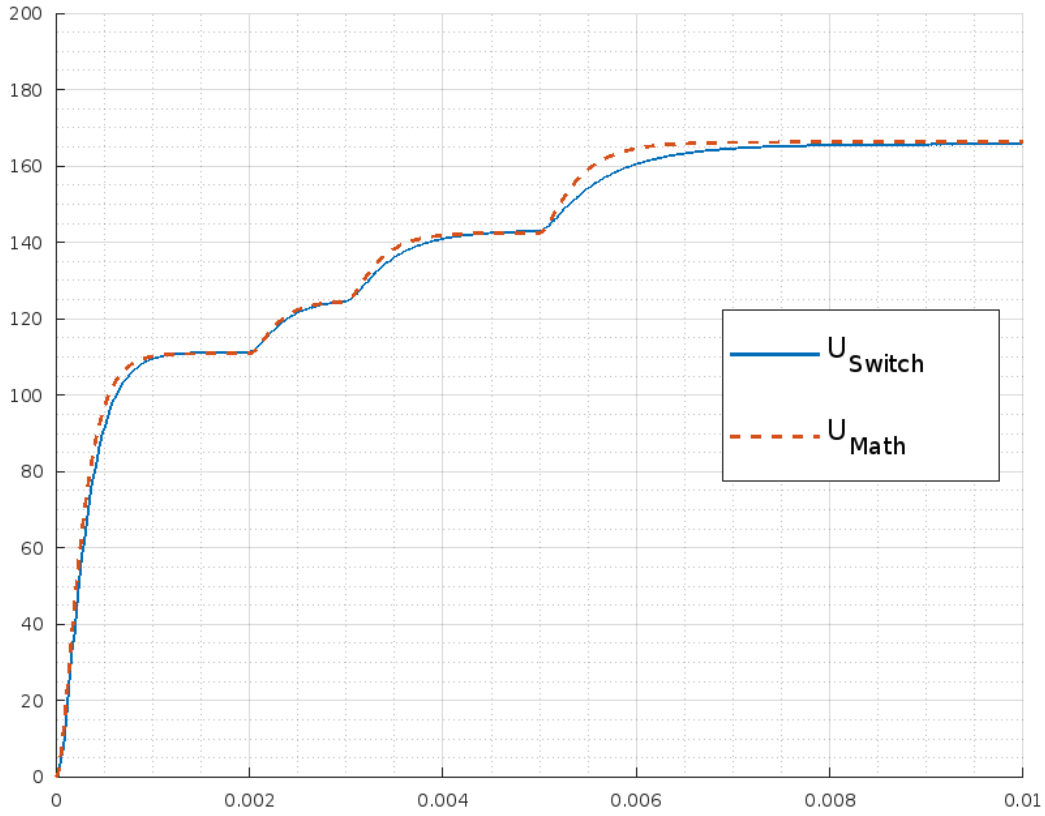
```
L = 50*1e-6;            % Inductivity
R_L = 750e-3;           % Internal Inductivity Resistance
R_DS = 50e-3;           % Drain-Source Resistance
R = 500;                % Load Resistance
C = 330e-6;             % Capacity
U_0 = 100;              % Source Voltage
t = 1e-3*[0,2,3,5,10];
D = [0.1,0.2,0.3,0.4,0.5];
U_C0 = 0;               % Inital Capacity Voltage         ];
```

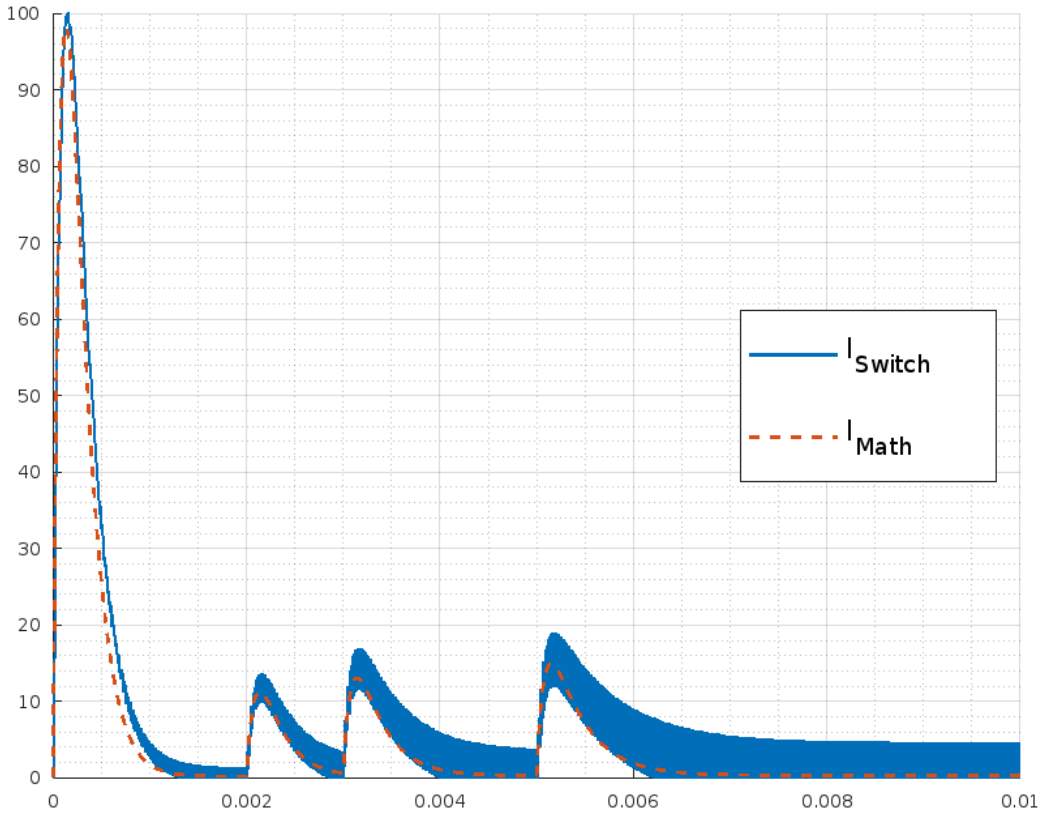
DCDC Parameter

```
frequency = 100e3;      % Switching Frequency
```

Simulation Setup

```
t_sim =  1000/frequency;
t_step = 0.001/frequency;
model = 'Boost_Converter_Model';
load_system(model);
sim(model,t_sim);
Boost_Converter_Plot
```





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