ECE331 HW6 - Question 2

Contents

Variables

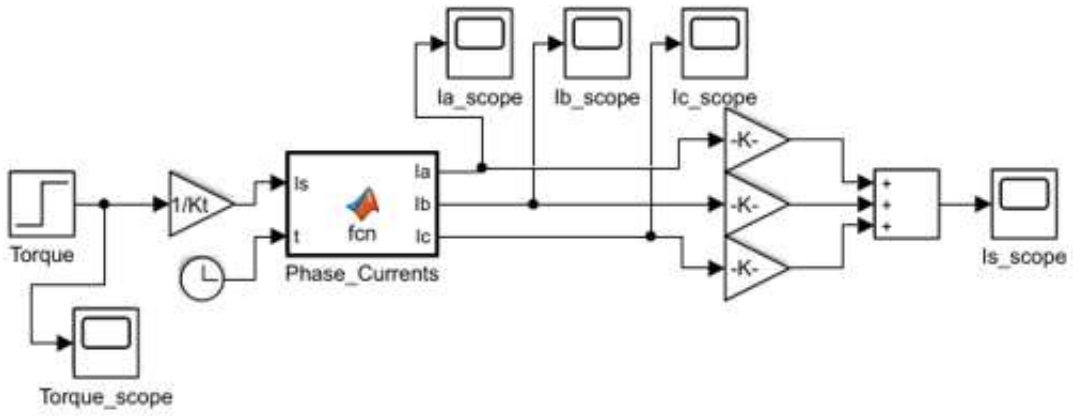
Variables used in system

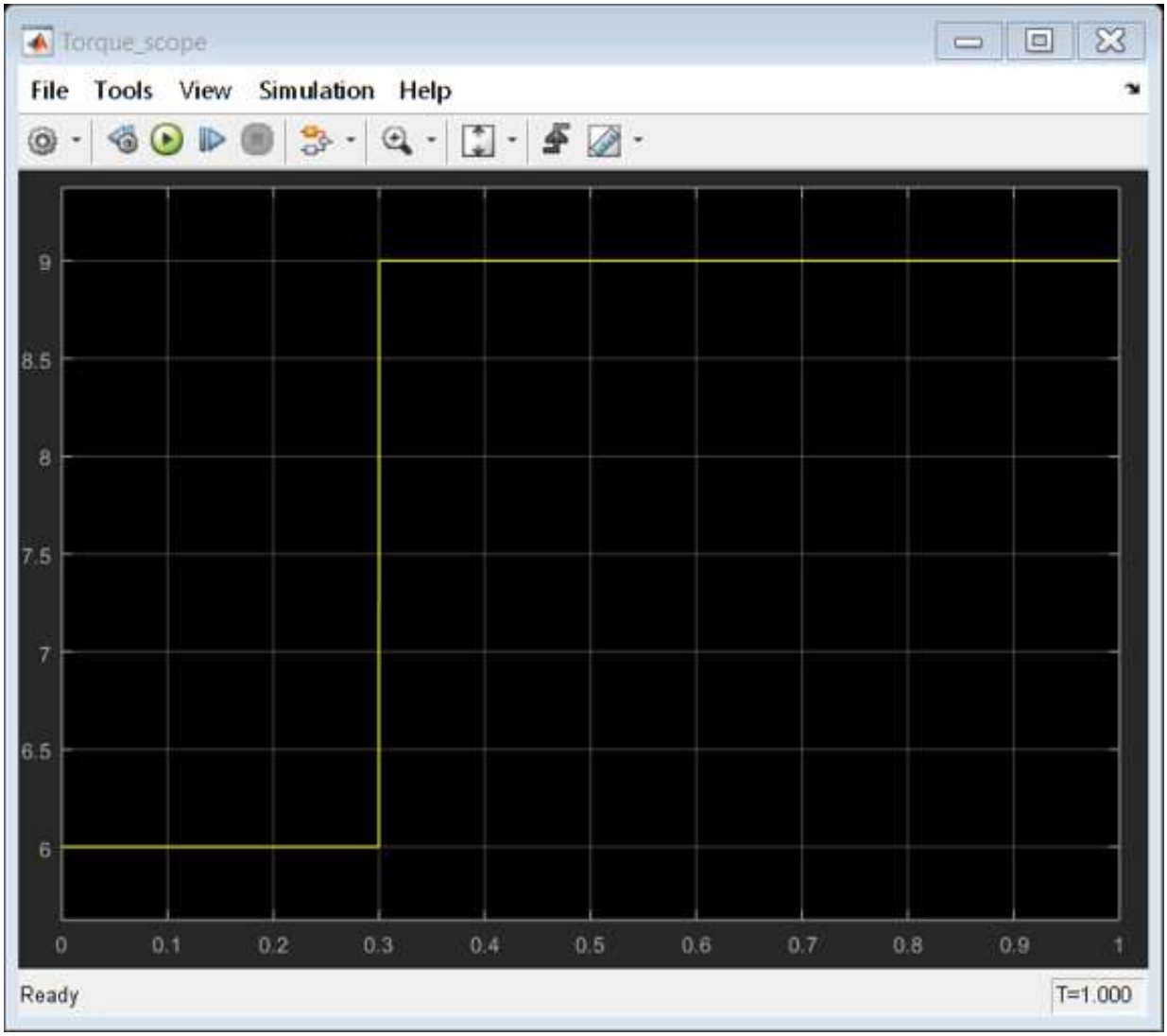
```
Tem_initial = 6;
Tem_final = 9;
Kt = 0.3;
w = 3600;
```

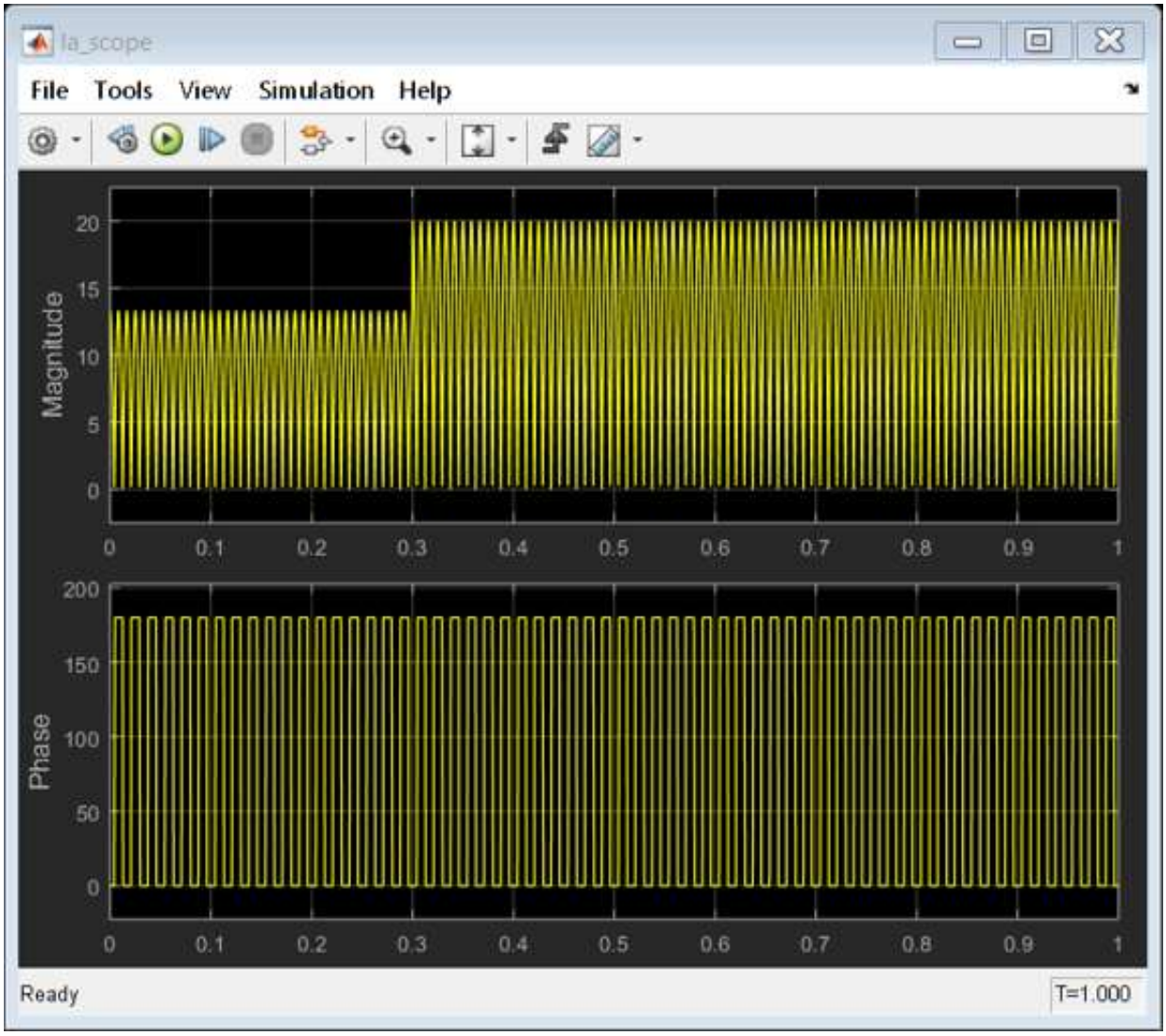
Simulink Model

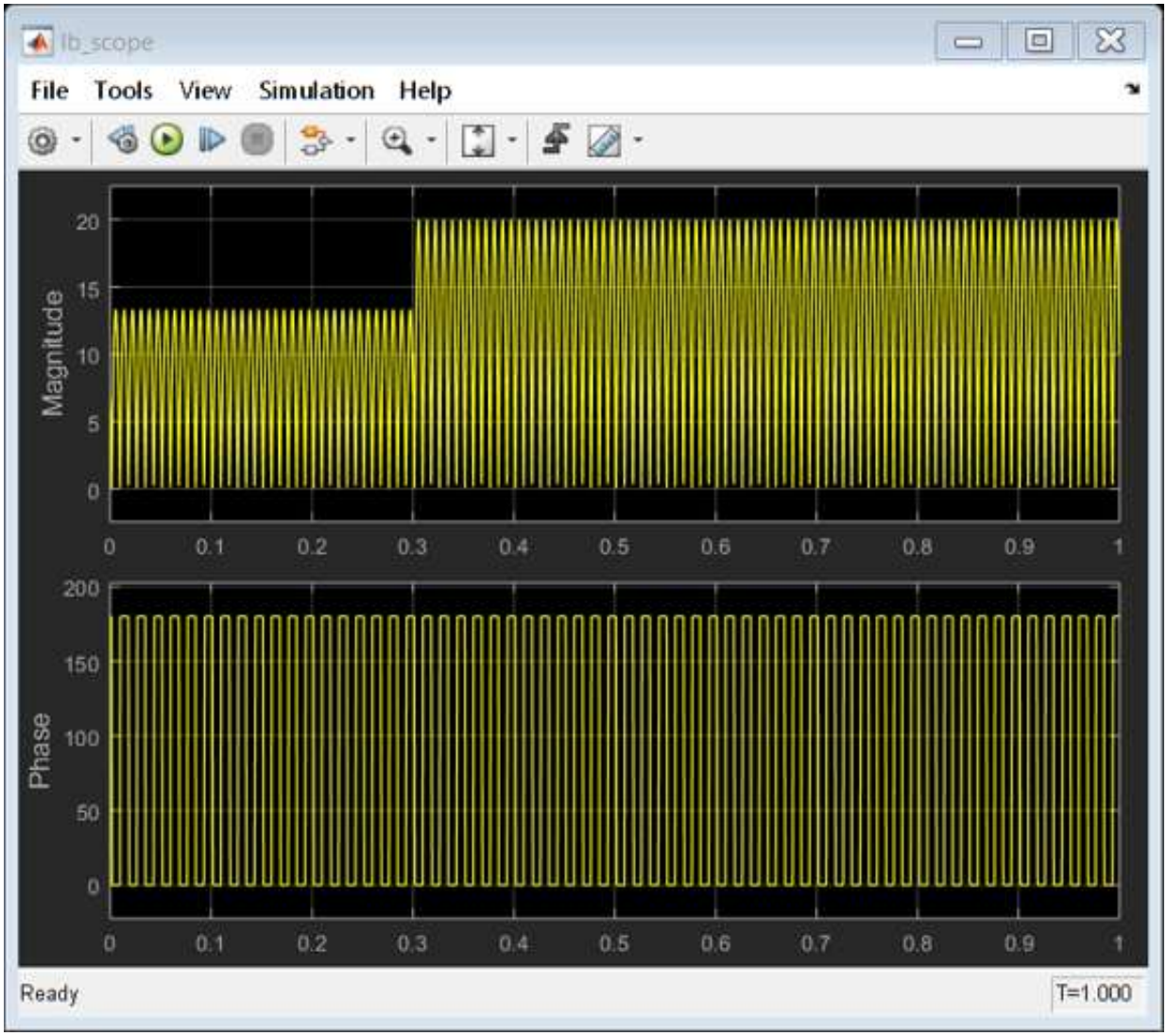
Simulink model, equation block, and graphs of T, Ia, Ib, Ic, and Is

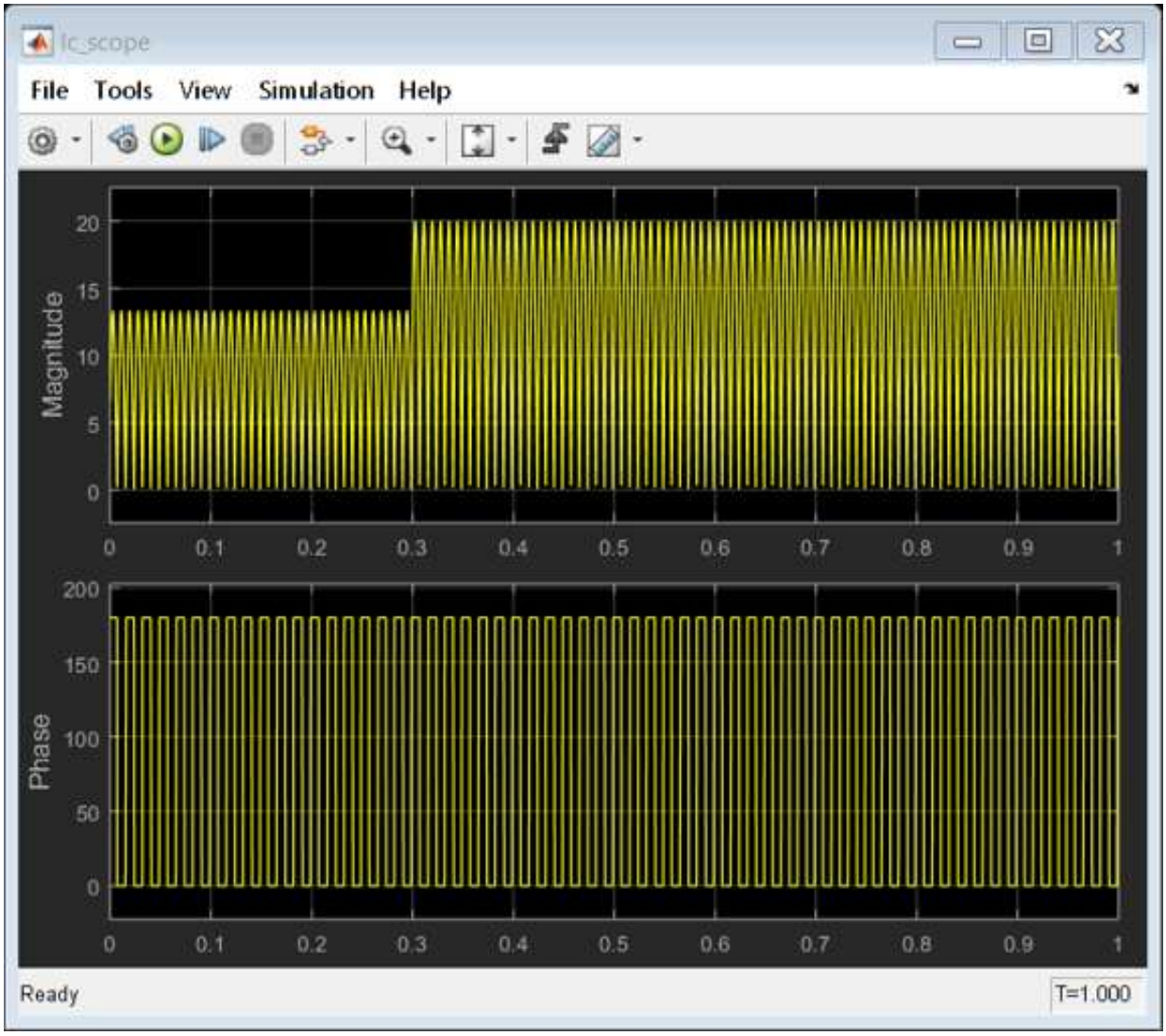
```
open_system('Question2_simulink'); % Opens simulink model
sim('Question2_simulink'); % Runs simulink model

open_system('Question2_simulink/Phase_Currents'); % Function block for calculating phase curr
ents

open_system('Question2_simulink/Torque_scope'); % Torque input graph
open_system('Question2_simulink/Ia_scope'); % Ia magnitude and phase
open_system('Question2_simulink/Ib_scope'); % Ib magnitude and phase
open_system('Question2_simulink/Ic_scope'); % Ic magnitude and phase
open_system('Question2_simulink/Is_scope'); % Is magnitude and phase
```

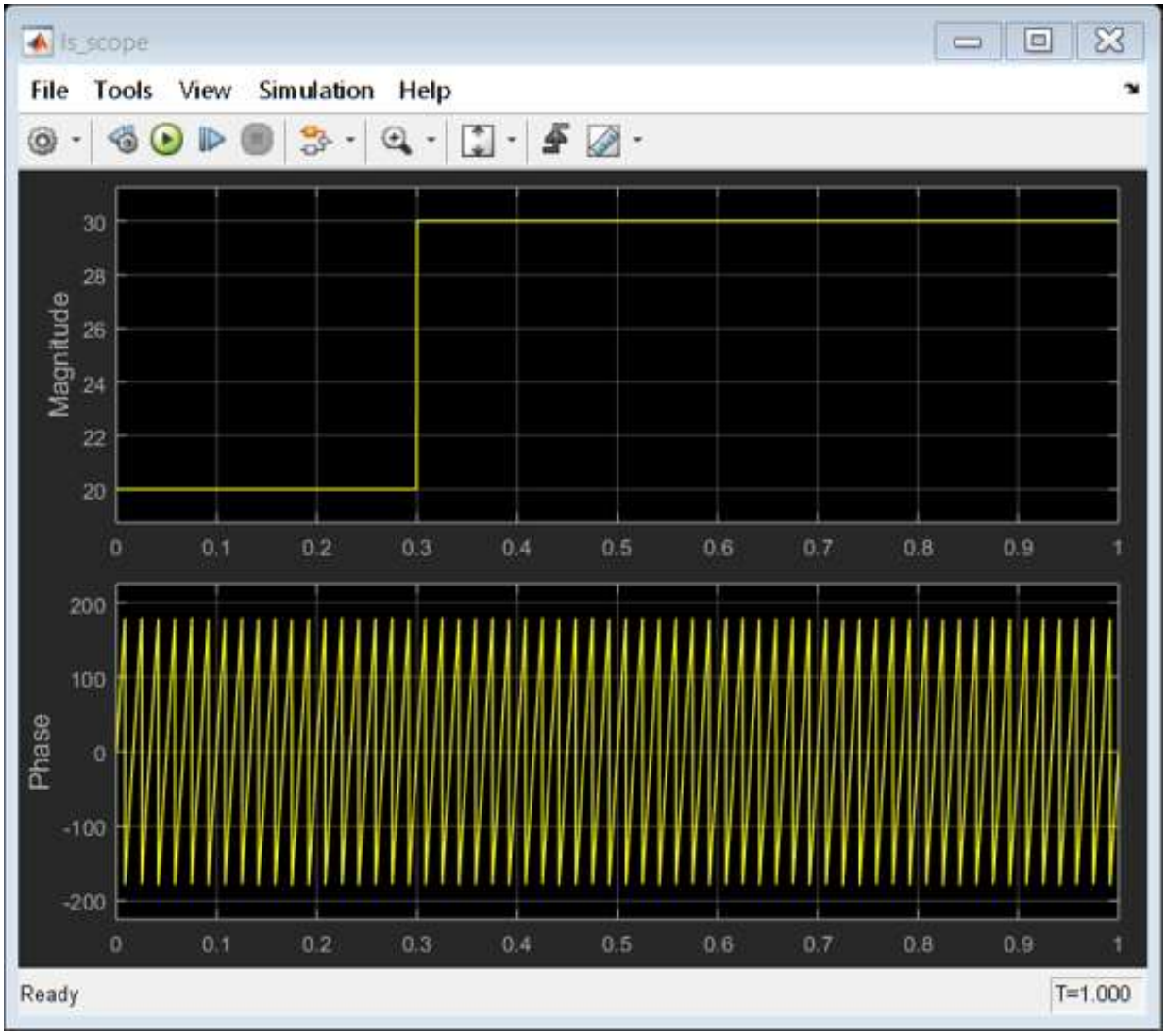



Torque_scope
File Tools View Simulation Help
9
8.5
8
7.5
7
6.5
6
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Ready
T=1.000


la_scope
File Tools View Simulation Help
Magnitude
20
15
10
5
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Phase
200
150
100
50
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Ready
T=1.000


lb_scope
File Tools View Simulation Help
Magnitude
20
15
10
5
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Phase
200
150
100
50
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Ready
T=1.000


lc_scope
File Tools View Simulation Help
Magnitude
20
15
10
5
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Phase
200
150
100
50
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
Ready
T=1.000



Appendix

```
% Phase currents simulink function:
%function [Ia, Ib, Ic]= fcn(Is,t)

%w = 2*pi*60;
%Is = Is*exp(1i*w*t);

%Ia = (2/3)*real(Is*exp(1i*0));
%Ib = (2/3)*real(Is*exp(1i*((-2*pi)/3)));
%Ic = (2/3)*real(Is*exp(1i*((-4*pi)/3)));
```

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