**CEN455: Introduction Digital Control**

**Home-Work 1: 1st Semester 1439-1440**

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| **ID:** | **Name:** |

**Problem1:**

Given the electric network shown in Figure:

1. Write the differential equation for control solutions the network if *v*(t) = *u*(t), a unit step.



2. Solve the differential equation for the current, i(t), if there is no initial energy in the network.

3. Make a plot of your solution if$ \frac{R}{L}=1$



**Problem2:**

Find the transfer function, G(s) for system shown in Figures.





$G\left(s\right)=\frac{V\_{0}(s)}{V\_{i}(s)}$ $G\left(s\right)=\frac{X\_{1}(s)}{F(s)}$

**Problem3:**



For the unity feedback system,

1. Find the steady-state error for inputs of $30 u\left(t\right), 70 t u\left(t\right), and 81 t^{2}u\left(t\right) if$



2. Find the range of K for closed-loop stability if:

