Dept. Electrical and Computer Engineering
The University of British Columbia
EECE560 Network Analysis and Simulation January 2021
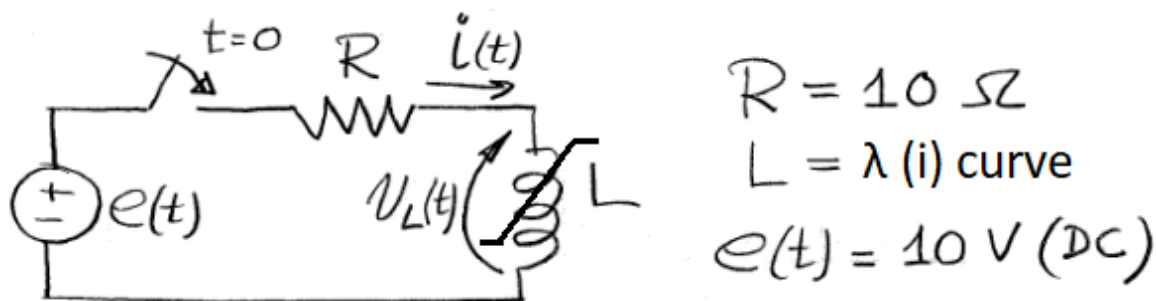Instructor: Dr. J. R. Martí

ASSIGNMENT No. 8
Due Date: 12 April

Non-Linear Elements

The simple RL circuit of Assignment 1 will be used to implement the nonlinear inductance model. The circuit is to be solved with your own program using nodal analysis and also with PSCAD. For your own solution use trapezoidal with CDA.

$$R = 10 \, \Omega$$
$$L = \lambda \, (i) \text{ curve}$$
$$e(t) = 10 \, V \, (DC)$$

The characteristic of the L is approximated with two line segments as follows
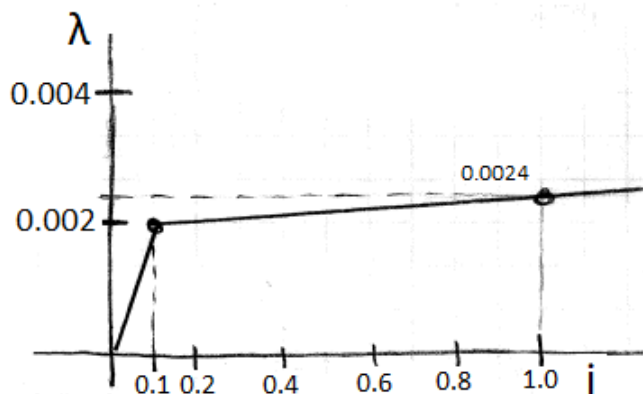
λ(Vm)	i(A)
0.002	0.1
0.0024	1.0

1. A step function $e(t)$ is applied at $t = 0$. Solve the circuit using nodal analysis for $i(t)$ and $v_L(t)$ from $t = 0$ to $t = 10\,\text{ms}$

2. Use trapezoidal with CDA for a time step $\Delta t = 0.1\,\text{ms}$.

3. Compare your own solution with the solution using PSCAD.

4. Compare your results with those obtained in Assignment 1.

5. Comment on the effect of having a saturating inductance versus a linear inductance.

6. General comments.