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École Polytechnique Fédérale de Lausanne
 Swiss Federal Institute of Technology Lausanne

Mathematical Modeling of Physical Systems

1st Homework Problem

- We wish to analyze the following electrical circuit.

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Problems I

- Write down all of the equations that you need to describe this circuit mathematically. You may use either the technique involving potentials or that involving mesh equations.
- Sort the equation system horizontally.
- Sort the horizontally sorted equation system vertically.
- Convert the horizontally and vertically sorted equation system to state-space form.

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Problems II

- Program the state-space model in Matlab.
- Simulate the circuit across **50 μsec** of simulated time, und plot the variable v_3 as a function of time. You may assume that the initial Voltage across the capacitance and the initial current through the inductivity are equal to **0.0**.

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