Problem 1: Circuit Analysis Methods

Find the current in the 3 Ω resistor
a) using the node-voltage method.
   b) using the mesh-current method.

Problem 2: Nodal Analysis of a circuit with dependent sources
Find the power absorbed by the 8 Ω resistor in the circuit below, using nodal analysis.

Problem 3: Source Transformation
Use a series of source transformations to find $i_o$ in the following circuit:
Problem 4: Thévenin Equivalent Circuit

Given the following circuit:

a) Find the Thévenin equivalent with respect to the terminals A,B:
b) Plot the $I-V$ characteristic for this circuit.
c) What is the power delivered by the circuit if a 5 kΩ resistor is connected between A and B?

Problem 5: Superposition

Consider the following circuit:

a) Find $V_{AB}$ using superposition.
b) Find $V_{AB}$ by applying Thévenin’s theorem successively to the circuit to the left of the dotted lines.