[30 pts.] In the drawing shown the network initially has no current. The switch S is closed for two time constants. Then the switch is opened. Call this t = 0.

(a) Calculate the time constant for the circuit after the switch is opened.
(b) Calculate the current in R₃ 1.80 × 10⁻⁶ seconds after t = 0.
(c) Calculate the current in R₄ at long times if the switch is closed.

\[ \tau = \frac{L}{R₁ + R₃ + R₄} = \frac{13.0 \text{ mH}/kΩ}{23.0 + 50.0 + 13.0} = 0.151 \times 10^{-6} \text{ See} \]

\[ R_{AB} = \frac{(R₂ + R₃) R₄}{R₂ + R₃ + R₄} = 11.03 \text{ kΩ} \]

\[ I_T = \frac{E}{R₁ + R_{AB}} = 5.114 \times 10^{-2} \text{ mA} \]

\[ I_L(\infty) = \frac{I_T R_{AB}}{R₄} = 4.34 \times 10^{-2} \text{ mA} \]

\[ I(2\tau₁) = I_L(\infty) \left[ 1 - e^{-2\tau₁/\tau} \right] = 3.752 \times 10^{-2} \text{ (mA)} \]

\[ I_L(\infty) = (8.0 \times 10^{-6}) = I(2\tau) e^{-\tau/\tau} = 3.752 \times 10^{-2} e^{-180 \times 10^{-6}/0.15 \times 10^{-6}} \approx 2.49 \times 10^{-6} \text{ mA} \]

\[ \mathbf{P}_{R₂} = -I_L = -2.49 \times 10^{-6} \text{ A} \]

where the directions of the currents are defined in the circuit.