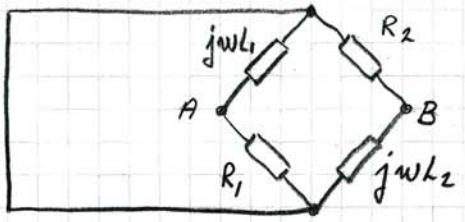
B1,13

a) THE INTERNAL IMPEDANCE Z_i. RESET E.



$L_1 = 1\,mH$

$L_2 = 1\,mH$

$R_1 = 2\,\Omega$

$R_2 = 2\,\Omega$

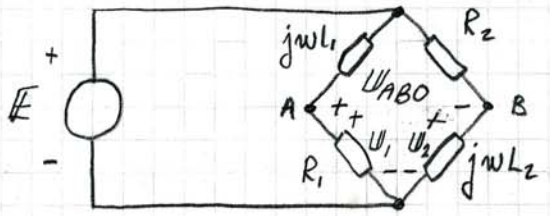
$w = 2000\,\pi\ \frac{RAD}{s}$

BETWEEN A AND B WE'VE GOT

$$Z_i = \frac{jwL_1 \cdot R_1}{jwL_1 + R_1} + \frac{jwL_2 \cdot R_2}{jwL_2 + R_2} \Rightarrow$$

$$Z_i = \ldots = \frac{j4\pi}{1 + j\pi} = \ldots \approx 3{,}8 \cdot e^{j17{,}7^\circ}\ \Omega$$

b) THE OPEN CIRCUIT VOLTAGE U_{ABO}.



$e(t) = 10\sqrt{2}\sin(wt + 0)\ V$

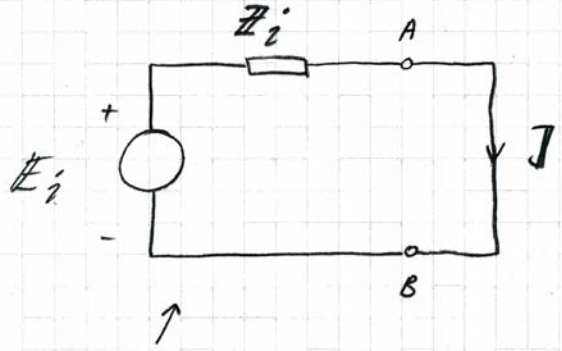
$E = 10\sqrt{2} \cdot e^{j0}\ V$

$$U_{ABO} = U_1 - U_2 = E \cdot \frac{R_1}{R_1 + jwL_1} - E \cdot \frac{jwL_2}{R_2 + jwL_2} \rightarrow$$

↑ VOLTAGE DIVIDING

$$U_{ABO} = \ldots = 10\sqrt{2}\left(\frac{1 - j\pi}{1 + j\pi}\right) = \ldots \approx 10\sqrt{2} \cdot e^{-j144{,}7^\circ}\ V$$

c) THE SHORT CIRCUIT CURRENT BETWEEN A & B.



$\underline{E}_i = U_{ABO}$

A THÉVENIN'S EQUIVALENT FOR THE GIVEN CIRCUIT.

$$J = \frac{\underline{E}_i}{\underline{Z}_i} \Rightarrow J = \frac{10\sqrt{2}\cdot e^{-j144,7^\circ}}{3,81\cdot e^{j17,7^\circ}} \approx 2,6\sqrt{2}\cdot e^{-j162,4^\circ} \text{ A}$$

$$i(t) \approx 2,6\sqrt{2}\sin(2000\pi t - 162^\circ) \text{ A}$$