Worksheet 6.1.2

$R1 := 5000\ \Omega$ $R2 := 20\ \Omega$ $R3 := 10^6\ \Omega$

$L1 := 1 \cdot 10^{-3}\ H$ $C1 := 100 \cdot 10^{-9}\ F$ $Vgen := 1\ V$

$dt := 10^{-8}\ s$

$$D := \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

$$\text{next}(D) := \left| \begin{array}{l} I2 \leftarrow D_2 \\ I3 \leftarrow D_3 \\ Q \leftarrow D_4 \\ I1 \leftarrow \frac{1}{R1 + R2} \cdot \left(Vgen + R2 \cdot I2 - \frac{Q}{C1} \right) \\ I2 \leftarrow \frac{1}{R2 + R3} \cdot \left(R2 \cdot I1 + R3 \cdot I3 + \frac{Q}{C1} \right) \\ dI3 \leftarrow \frac{dt}{L1} \cdot R3 \cdot (I2 - I3) \\ I3 \leftarrow I3 + dI3 \\ Q \leftarrow Q + (I1 - I2) \cdot dt \\ \begin{pmatrix} I1 \\ I2 \\ I3 \\ Q \end{pmatrix} \end{array} \right.$$

$T := 100 \cdot 10^{-6}\ s$

$N := \text{ceil}\left(\frac{T}{dt} \right)$

$i := 2 .. N$ $Iout_i := \left| \begin{array}{l} D \leftarrow \text{next}(D) \\ D_3 \end{array} \right.$ $t_i := (i - 1) \cdot dt$

Figure 6.1.5 Calculating the waveform of the current in 1 mH inductor

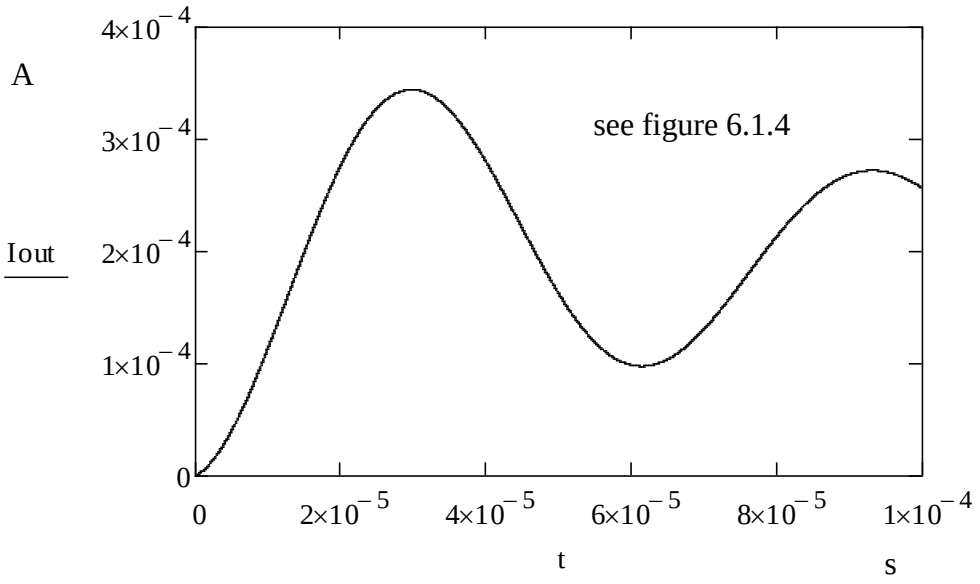

Figure 6.1.6 Waveform of the current in the inductor of the parallel LCR circuit

$$\frac{1}{2\cdot\pi\cdot\sqrt{L1\cdot C1}} = 1.592\times 10^{4} \qquad 2\cdot\pi\cdot\sqrt{L1\cdot C1} = 6.283\times 10^{-5}$$

$$\sqrt{\frac{L1}{C1}} = 100$$