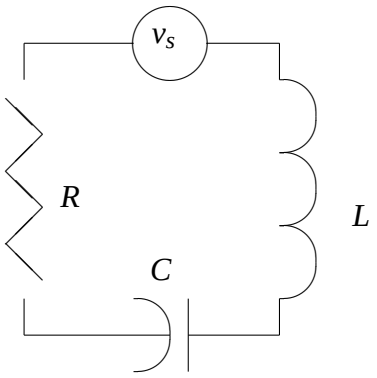
Practice

§3.5: 1,5,8,13
§3.6: 2,7,9,10,18,20a,21a,23a
§3.7: 7,13,15,17

Hand In

30) Using the method of indeterminate coefficients, find general solutions to the following differential equations:
a) $y''+y = xe^{-x}+\cos x$
b) $y''+y = (10x^5-x^3+23x^2-x-17)e^x\sin(x)$

31)
An electric circuit consisting of a resistor R, a capacitor C and a coil L is driven by a temporary changing voltage source v_s.
By Kirchhoff's Law, we have $V_L+V_R+V_C = v_s(t)$, where V_L, V_R, V_C respectively are the voltage changes measured over coil, resistor and capacitor, respectively. We also have a current I in the circuit that is equal at every place.
By Ohm's law, we have that $V_R = I\cdot R$, and Lenz' law gives that $V_L = L\cdot I'$. Finally, the capacitor determines the current by the law $I = C\cdot V_C'$.



a) Write down a differential equation for the voltage $v(t) = V_C(t)$ measured at the capacitor.
b) Assume the driving voltage fulfills $v_s(t) = \cos(\omega t)$. Determine a general solution for the differential equation in a).

32) Using the method of variation of parameters, determine a solution to the initial value problem:

$$\frac{\mathrm{d}^2y}{\mathrm{d}t^2}+4y = 4\tan(2x),\quad y(0)=10,\quad y'(0)=-2$$