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syms iL(t) tau R1 A w t
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Vs = A * sin(w * t)
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vs = A sin(t w)
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ode = tau * diff(iL, t) + iL == Vs / R1
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ode(t) =
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$$\tau \frac{\partial}{\partial t} iL(t) + iL(t) = \frac{A \sin(t w)}{R_1}$$

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DiL = diff(iL, t)
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DiL(t) =
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$$\frac{\partial}{\partial t} iL(t)$$

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dsolve(ode, DiL(0)==0)
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ans =
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$$\frac{A \tau w e^{-\frac{t}{\tau}}}{R_1 \tau^2 w^2 + R_1} - \frac{A \left( w \cos(t w) - \frac{\sin(t w)}{\tau} \right)}{R_1 \tau \left( \frac{1}{\tau^2} + w^2 \right)}$$