

実習21.4

(1)

> dsolve(diff(x(t), t, t) == -x(t) - 0.2 * diff(x(t), t), x(t))

$$x(t) = _C1 e^{-\frac{t}{10}} \sin\left(\frac{3\sqrt{11}t}{10}\right) + _C2 e^{-\frac{t}{10}} \cos\left(\frac{3\sqrt{11}t}{10}\right) \quad (1)$$

> dsolve(diff(x(t), t, t) == -x(t) - 2 * diff(x(t), t), x(t))

$$x(t) = _C1 e^{-t} + _C2 e^{-t} t \quad (2)$$

> dsolve(diff(x(t), t, t) == -x(t) - 20 * diff(x(t), t), x(t))

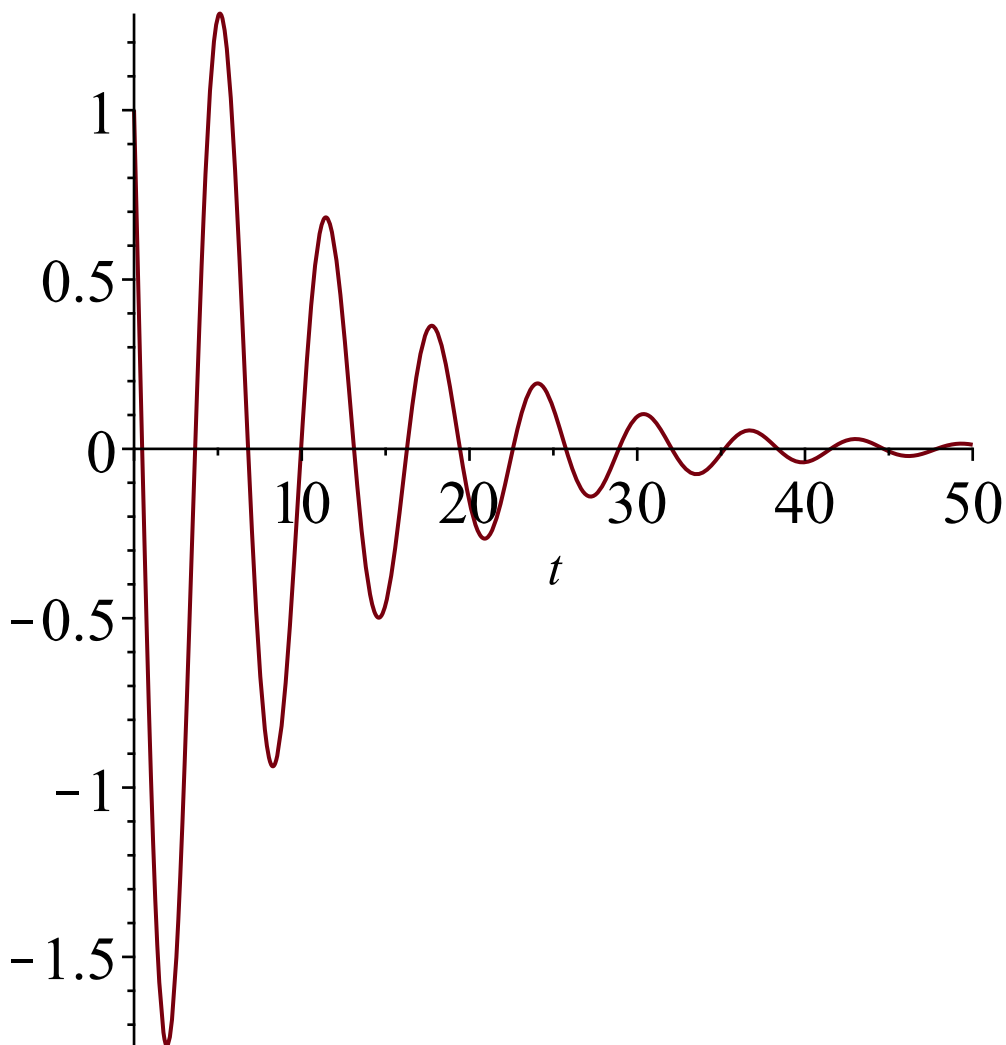
$$x(t) = _C1 e^{(-10 + 3\sqrt{11})t} + _C2 e^{-(10 + 3\sqrt{11})t} \quad (3)$$

(2)

> dsolve({diff(x(t), t, t) == -x(t) - 0.2 * diff(x(t), t), x(0) = 1, D(x)(0) == -2}, x(t))

$$x(t) = -\frac{19\sqrt{11} e^{-\frac{t}{10}} \sin\left(\frac{3\sqrt{11}t}{10}\right)}{33} + e^{-\frac{t}{10}} \cos\left(\frac{3\sqrt{11}t}{10}\right) \quad (4)$$

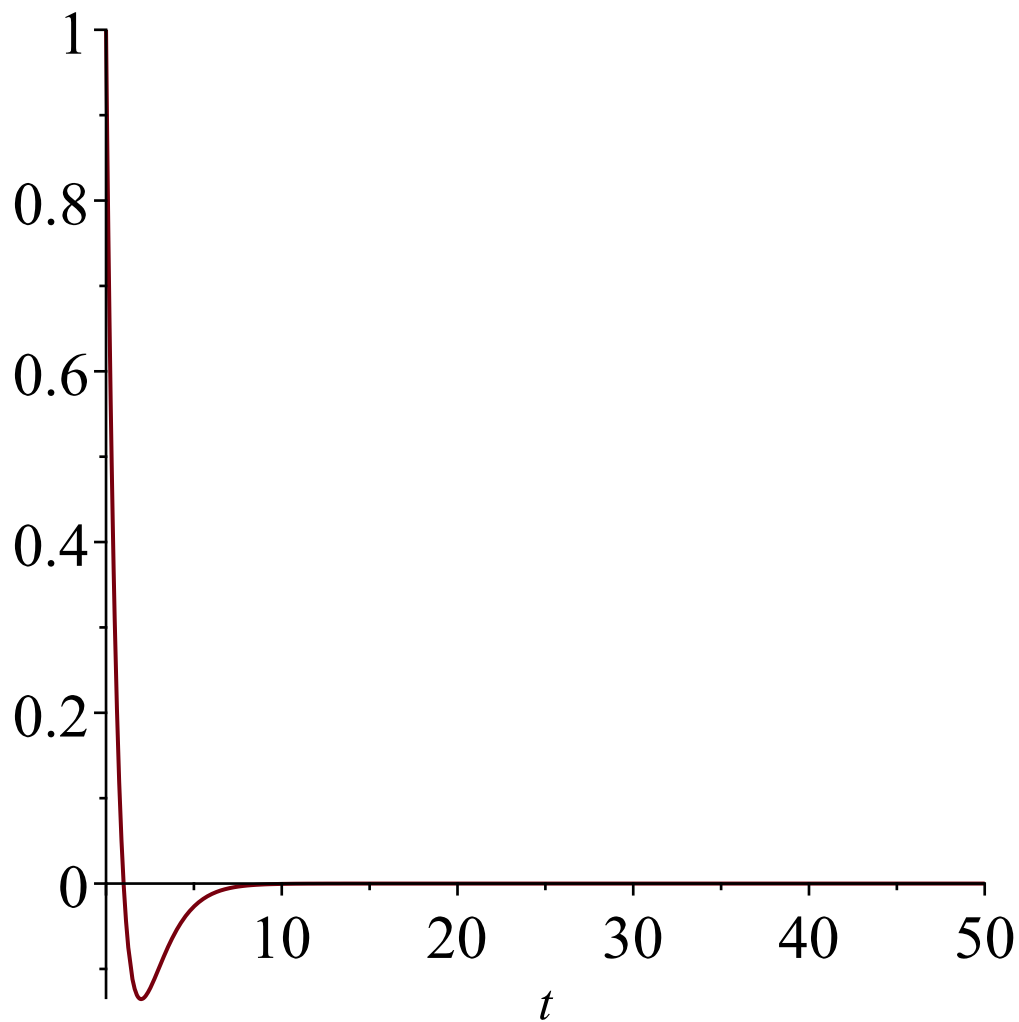
> plot(rhs(%), t=0..50)



> dsolve({diff(x(t), t, t) == -x(t) - 2 * diff(x(t), t), x(0) = 1, D(x)(0) == -2}, x(t))

$$x(t) = e^{-t} - e^{-t} t \quad (5)$$

> plot(rhs(%), t=0..50)



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> dsolve( {diff(x(t), t, t) = -x(t) - 20·diff(x(t), t), x(0) = 1, D(x)(0) = -2}, x(t))
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$$x(t) = \left(\frac{1}{2} + \frac{4\sqrt{11}}{33} \right) e^{(-10 + 3\sqrt{11})t} + \left(\frac{1}{2} - \frac{4\sqrt{11}}{33} \right) e^{-(10 + 3\sqrt{11})t}$$

(6)

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> plot(rhs(%), t=0..50)
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