These examples set out the syntax for solving a differential equation using Maple. Start any session by typing

\texttt{with(DEtools)}

to load the necessary routines.

**Example 0.1.** A first order equation without initial conditions:

\[ y' + 2y = t + 1 \]

Type

\texttt{dsolve(y'(t) + 2*y(t) = t + 1, y(t))}

This will produce

\[ y(t) = \frac{1}{2}t + \frac{1}{4} + e^{-2t}C_1. \]

Remember to include the \( y(t) \) at the end to tell MAPLE that you want a solution for \( y \) in terms of \( t \).

If you have an initial condition, say \( y(0) = 3 \), then this is incorporated by typing

\texttt{dsolve({y'(t) + 2*y(t) = t + 1, y(0) = 3}, y(t))}

Note that the differential equation and initial condition are now contained within \{\cdots\}\)

This will produce

\[ y(t) = \frac{1}{2}t + \frac{1}{4} + \frac{11}{4}e^{-2t}. \]
Example 0.2. A second order equation without initial conditions:

\[ y'' + 3y' - 4y = e^t \]

Type

\[ \text{dsolve(y''(t) + 3*y'(t) - 4*y(t) = exp(t), y(t))} \]

This will produce

\[ y(t) = e^{-4t}C_1 + e^tC_2 + \frac{1}{3}te^t \]

If we have initial conditions, say \( y(0) = 0, \ y'(0) = 1 \), then type

\[ \text{dsolve(\{y''(t) + 3*y'(t) - 4*y(t) = exp(t), y(0) = 0, y'(0) = 1\}, y(t))} \]

Note that the differential equation and initial conditions are now contained within \( \{\cdots\} \)

This will produce

\[ y(t) = -\frac{4}{25}e^{-4t} + \frac{4}{25}e^t + \frac{1}{5}te^t \]