restart; with(DEtools): with(linalg): with(plots):
An example of using Maple to find solutions to IVP for a given ODE
(Text, problem 4.6.25).
Consider the ODE (linear, homogeneous, constant coefficients):
\[ \text{de1} := \text{D}(\text{D}(y))(x) - 2\text{D}(y)(x) + 2y(x) = 0; \]
\[ \text{de1} := (\text{D}^2(y))(x) - 2\text{D}(y)(x) + 2y(x) = 0 \]
The initial conditions are
\[ \text{init\_con} := y(\pi) = \exp(\pi), \text{D}(y)(\pi) = 0; \]
\[ \text{init\_con} := y(\pi) = e^\pi, \text{D}(y)(\pi) = 0 \]
We now compute the solution using DSOLVE:
\[ \text{solution} := \text{dsolve}\{\text{de1, init\_con}\},\{y(x)\}; \]
\[ \text{solution} := y(x) = e^x \sin(x) - e^x \cos(x) \]
Now some MAPLE esoterica: convert the FUNCTION \( y(x) \) to an EXPRESSION that can be evaluated and plotted;
this is done with the command \( \text{subs} \):
\[ \text{expr} := \text{subs}(\text{solution}, y(x)); \]
\[ \text{expr} := e^x \sin(x) - e^x \cos(x) \]
\[ \text{plot}(\text{expr}, x=0..5, \text{axes} = \text{BOXED}, \text{title} = "\text{solution to a 2nd order IVP}"); \]