DEPARTMENT OF MATHEMATICS

MATHS 260 Tutorial 12

Note: There is no assignment covering the last few lectures in the course. As the lecture material is examinable (with the exception of Lecture 29), you are well-advised to do this tutorial!

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1. Find the general solution to the following differential equations:

   (a) $\dfrac{d^2y}{dt^2} + 3\dfrac{dy}{dt} + 2y = t^2$

   (b) $\dfrac{d^2y}{dt^2} + \dfrac{dy}{dt} - 2y = e^{-t}$

2. Consider the forced harmonic oscillator modelled by the differential equation

$$\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 5y = \sin(t).$$

   (a) Find the general solution.

   (b) **Without using Matlab**, describe the longterm behaviour of the solution. You can then use `analyzer` with different initial conditions to check your answer.