

Linear Ordinary Differential Equations

- Which of the following functions are solutions to the differential equation $y'' - y = 2 - t^2$?
 - $f(t) = t^2$
 - $g(t) = e^t$
 - $h(t) = \sin(t) + t^2$
 - $k(t) = 2e^t + t^2$
- Which of the functions in the previous problem are solutions to the initial value problem $y'' - y = 2 - t^2$, $y(0) = 1$, $y'(0) = 1$?
- Show that if f and g are both solutions to the differential equation $y''' - 5y'' + 17y' - 3y = 0$ then so is $5f + 3g$.
- Find the general solution to the following differential equations.
 - $y'' - 2y' - 3y = 0$
 - $y''' + 5y'' + 4y' = 0$
 - $y'' - 6y' + 9y = 0$
 - $y''' - 5y'' = 0$
- For each function below, find a homogeneous linear ordinary differential equation to which it is a solution.
 - $e^{7t} + 4e^{-3t}$
 - te^{2t}