

Math 322 Homework 2

Solve each of the following differential equations. Your solution should have the form $y = \text{etc}$. In other words, I'm looking for an explicit solution. Don't worry about the maximal interval in which your solution is defined, but if your initial condition is given at time t_0 , make sure your solution is defined about the point t_0 . Don't leave answers with complex numbers, e.g., use sines and cosines rather than e^{it} .

1. $y' = \frac{\cos t}{y}$, $y(0) = -4$.
2. $2ty y' = t^2 + y^2$, $y(1) = 0$.
3. $y' = y^2 + 2y + 1$, $y(0) = -1$.
4. $3t^2y + y + (t^3 + t + 2y)y' = 0$, $y(0) = 2$.
5. $e^{-t}y' = 3e^{-t}y + 1$, $y(0) = 0$.
6. $y' + y = ty^3$, $y(0) = 1$.
7. $y'' - y' - 12y = 0$, $y(0) = 1$, $y'(0) = 2$.
8. $y'' + 25y = 0$, $y(0) = 1$, $y'(0) = -1$.
9. $8y'' + 2y' - y = 0$, $y(-1) = 1$, $y'(-1) = -2$.
10. $y''' - 6y'' + 9y' = 0$, $y(0) = 0$, $y'(0) = 1$, $y''(0) = -1$.