Math Xb Spring 2005
Introduction to Differential Equations

April 27, 2005

1 Goals

- To know the basic terminology of differential equations.
- To use the differential equation $\frac{dy}{dt} = ky$ and its solution $y(t) = Ce^{kt}$ to model and analyze exponential growth and decay problems.
- To solve the differential equation $\frac{dy}{dt} = ky$ given an initial condition.
- To be able to test whether a given function is a solution for a given differential equation.

2 New Terms

- Differential equation. An equation involving a derivative.
- General solution. A formula is a *general solution* to a differential equation if any solution to the differential equation can be written in this form. General solutions contain constants. For example, the differential equation $\frac{df}{dt} = 2t$ has general solution $f(t) = t^2 + C$.
- Particular solution. A solution to a differential equation whose parameters (constants) have all been determined is called a *particular solution*. For example $f(t) = t^2 - 5$ and $f(t) = t^2$ are both particular solutions to the differential equation $\frac{df}{dt} = 2t$.
- Initial condition. An initial condition is a data point – one value of the independent variable along with the corresponding value of the dependent variable (the function).
- Solution Curve. The graph of a solution to a differential equation is sometimes called a *solution curve*.

3 References

- §15.2 and 31.1 in *Calculus: An Integrated Approach to Functions and Their Rates of Change*.