First-Order Linear Equations

The next type of equation we want to try to solve is first-order linear equations. We mentioned before that linear equations made things easier, but we haven't looked into how to solve them yet.

Definition. Assume that we have a differential equation of the form $\frac{dy}{dt} + p(t)y = g(t)$. We say that this equation is

If $g(t) = 0$, then this equation is separable, and we know how to solve those. If not, then what can we do?

Example. Solve the differential equation

$$t^2 \frac{dy}{dt} + 2ty = e^t.$$