Introduction

In this section we show how to solve the constant coefficient linear ODE with polynomial input. That is,

$$p(D)y = q(x), \quad \text{where } q(x) \text{ is polynomial.}$$

Any function can be approximated in a suitable sense by polynomial functions, and this makes polynomials an important tool. In addition the technique we will learn, called the method of **undetermined coefficents**, is a good example of a general class of method widely used in mathematics, which go as follows: make an intelligent guess as to the *form* of the solution, leaving as letters any unknowns; plug this "trial solution" into the equation to be solved; and use it to determine the unknown values. Hence the slightly inaccurate name "undetermined coefficents" in this case – no worries, they won't be undetermined for long!

18.03SC Differential Equations
Fall 2011