Method of Undetermined Coefficients

This is about the world's fastest way to solve differential equations. And you will like that method. First we have see what equations will we be able to solve.

Linear Constant coefficients.

$$y'' + y' + y = f(t)$$

$f(t)$ is a "nice function". We will see which are the nice functions. For example e^{st}. And the key is we are looking for a particular solution, because we know how to find null solutions. And the point is, we know what to look for. We just have some coefficient to find and we will find that by substituting in the equation.

$e^{st}, t, \sin t$ are good examples to show. So nice functions include exponentials, polynomials, trigonometric functions are really exponentials. And the product of these functions.

The key point is if we take the nice function 's derivative, we get a function of the same form. And they are nice for Laplace transforms.

Special cases will happen in resonance case.