Goal and idea - Module 16

GOAL:

We develop a method in which we transform differential equations into algebraic expressions which we are able to solve. However, we then also need to transform these answers back to proper solutions for the differential equation. We will

- define the Laplace transform of functions and learn how to calculate it;
- discuss the inverse of the Laplace transform and how to compute it;
- determine the Laplace transform of derivatives of a function;
- recall partial fraction decomposition, which is often needed in this process;
- solve IVPs utilizing the theory of the Laplace transform; and
- expand our use of this process by learning how to translate the functions we evaluate by exponential terms.

IDEA:

We learn about the Laplace transform defined on a number of common functions (polynomials, exponential functions, trig, etc.) and then note how the linearity of the Laplace transform allows us to compute linear combinations of these functions. In general, we use the Laplace transform to transform the differential equation into a simpler equation we can solve. We then use the inverse of the Laplace transform to map these solutions back into the appropriate form.