

DUE DATE: The homework problems from this handout are due **Monday, March 30th**. There will be a proficiency exam in class on **Wednesday, April 1st**.

Section 5.1: The Definition of the Laplace Transform - covered in Weeks 9-10, homework is due with this week's assignment.

homework pg. 196-7, # 2, 3, 8 (note that you can check your answers using the Table on pg. 204), 25, 28 (also plot $f(t)$ by hand for each of these; this should be simple, but you should do this to make sure you know what it looks like).

Section 5.2: Basic Properties of the Laplace Transform -

1. Property 1: Laplace transforms of derivatives of a function can be expressed in terms of Laplace transforms of the function
2. Property 2: the Laplace transform is linear
3. Property 3: multiplying a function by an exponential translates its Laplace transform by a constant (from the exponent of the exponential)
4. Property 4: the Laplace transform of t^n times a function equals $(-1)^n$ times the n th derivative of its Laplace transform (with respect to s)

homework pg. 201-2, # 4, 19, 24, 27, 32.

Section 5.3: The Inverse Laplace Transform - To find the inverse Laplace transform of a given $F(s)$, the idea is to break $F(s)$ into pieces, each of which is a standard form, as listed in Table 1 on pg. 204. Breaking up $F(s)$ sometimes can be done using algebra. If $F(s)$ is a rational function, or ratio of two polynomials, then the algebraic technique of partial fractions may be useful for this.

homework pg. 208-9, # 1, 8, 14, 19, 24.

Section 5.4: Using the Laplace Transform to Solve Differential Equations - From Section 5.2, we know how to take Laplace transforms of linear combinations of derivatives of a function $y(t)$, as might appear on the left hand side of an ODE. Hopefully we can also use the tools from that section to take the Laplace transform of the right hand side of the ODE. Then we use algebra to isolate $\mathcal{L}\{y(t)\}(s) = Y(s)$ and use inverse Laplace transforms from Section 5.3 to convert $Y(s)$ back to $y(t)$.

homework pg. 214, # 3, 5, 19, 25.