USING THE FIRST TRANSLATION THEOREM

$$\mathcal{L}\{e^{at}f(t)\} = F(s-a). \tag{1}$$

- To compute the transform of a function with structure $g(t) = e^{at}f(t)$ for some constant a and function f:
  1. Identify the components that match the left side of (1): the constant a and the function f, including both the general form of f and any specific parameter values.
  2. Use the identifications from the left side to compute the components needed for the right side.
  3. Write the results of the computation.

- To invert a tranform $Y(s)$ using the first translation theorem:
  1. Identify the components that match the right side of (1): the constant a and the function F.
     (a) Manipulate the function Y so that the choice of a becomes clear.
     (b) Solve the equation $F(s-a) = Y(s)$ to determine the function $F(s)$.
  2. Use the identifications from the right side to compute the components needed for the left side.
  3. Write the results of the computation.