Week 10 Summary:

- **Laplace transforms:** \( \mathcal{L}(f)(s) = \int_0^\infty f(t) e^{-st} \, dt = F(s) \).

- *Useful for solving ODEs* when the forcing term \( f(t) \) is discontinuous.

- **Inverse Laplace transforms:**
  - *Factor*
  - *Partial fractions*
  - *Complete the square, etc.*

- **Piecewise continuous functions** can be written concisely using the Heaviside functions.

- **Shifts in the t-domain** correspond to multiplication by exponentials in the s-domain (and vice-versa).
  - \( \mathcal{L}(e^{ct} f(t))(s) = F(s-c) \) \( (-\infty < c < \infty) \)
  - \( \mathcal{L}(f(t-c) H(t-c))(s) = e^{-cs} F(s) \) \( (0 \leq c < \infty) \)