Week 4 summary:

- Logistic equation: \( y' = r y (1 - \frac{y}{M}) \)
  \( y(t) = \frac{M}{1 + (e^{-rt})} \)

Add an "extinction threshold":

\( y' = -r y (1 - \frac{y}{M})(1 - \frac{y}{T}) \)

- 2nd order linear ODEs: \( y'' + p(t)y' + q(t)y = f(t) \)
  Homogeneous if \( f(t) = 0 \).
  General solution: \( y(t) = y_h(t) + y_p(t) = C_1 y_1(t) + C_2 y_2(t) + y_p(t) \).

- Constant coefficients: \( y'' + py' + qy = 0 \)
  Assume \( y(t) = e^{rt} \), plug back in and solve for \( r \).
  Get \( e^{rt}(r^2 + pr + q) = 0 \).