* Introduction
  + Break down the title
    - Convection: energy transfer from molecule movement
    - Common envelopes
      * Binary systems: system with two stars, one larger (primary) and one smaller (secondary)
      * Interaction between the two produces the common envelope
    - Ejection efficiency
      * Orbital energy: energy released as the secondary travels through the primary
      * Percentage of orbital energy available to unbind the common envelope
      * Traditionally, alpha is a set constant based on observations of common envelope systems
    - Massive stars: stars at least 8 times the mass of the Sun
    - Shredding radius: radius at which the secondary is torn apart by the primary
  + Overall method
    - MESA
      * The interior of the star is governed by math and physics, but since that’s way too much math to do by hand, we used MESA
    - Found convection zones
      * Area of common envelope where energy is transported to the surface through molecule movement
    - Used the location and size of the convection zones to estimate the ejection efficiency
    - Used Python for numerical analysis and plots
* Methods
  + Time-scale
    - Convective time-scale: how long it takes for convection to happen
    - Inspiral time-scale: how long it takes for the secondary to spiral into the primary (orbit to decay)
    - If the convective time-scale is greater than the inspiral time-scale, convection cannot move anything, because the orbit of the secondary will have decayed before energy can be transported to the surface
    - If the inspiral time-scale is greater than the convective time-scale, convection is able to move some energy to the surface, though the exact amount depends on other factors
  + Luminosity
    - Luminosity: how fast the star is emitting energy, or basically how bright the star is
    - Maximum luminosity: maximum luminosity accommodated by the convective envelope
    - Drag luminosity: the luminosity generated by the inspiral of the secondary
    - Dependent on time-scale
      * If the maximum luminosity is greater than the drag luminosity, convection is able to remove some energy up to the drag luminosity
      * If the drag luminosity is greater than the maximum luminosity, convection is able to remove all energy because the common envelope cannot contain all the energy
  + Use luminosity and timescale to find convection zones
    - The time-scale and luminosity data can be combined to find the convective zones, or the areas where energy can be transported to the star’s surface via convection
    - Recall that if the convective time-scale is greater than the inspiral time-scale, convection cannot remove any energy, because the secondary will already have decayed before energy can reach the surface
    - However, if the inspiral time-scale is greater than the convective time-scale, energy can be removed via convection, though the exact amount depends on the luminosity
    - If the maximum luminosity is greater than the drag luminosity, then only some energy can be removed, up to the drag luminosity
    - If the drag luminosity is greater than the maximum luminosity, all energy can be removed
    - Comment on the x-axis: normalized radius, cut off at the shredding radius
  + Energy
    - Binding energy: amount of energy it would take to remove the common envelope at that point
    - Change in orbital energy: energy released during inspiral
    - If the binding energy is greater than the change in orbital energy at the shredding radius, the secondary will shred during inspiral before enough energy is transferred to unbind the envelope of the primary
    - If the change in orbital energy is greater than the binding energy at the shredding radius, enough energy is transferred to unbind the envelope
  + Use convection zones and energy plots to find ejection efficiency
    - Ejection efficiency: percentage of orbital energy available to unbind the common envelope, i.e. is not lost to convection
      * is set as either 0 (in the convective region, we assume that all energy is carried away and lost so the efficiency is 0) or 1 (all other places, we assume that the energy is distributed evenly throughout)
      * Multiply that by the change in orbital energy
      * Integrate from the initial position (probably the surface) to the final position of the secondary, which is either the shredding radius or where the change in orbital energy = the binding energy, whichever is bigger)
      * Divide by the change in energy between those two locations
* Results
  + Makes sense for the lower ones but not so much for the higher masses
* Future work/next steps
  + Do it for 60M, 70M