

ASTR702 - HW7

October 20, 2024, Due October 25, 2024

2 pt each part

- 1) Revisit your  $d \ln P / d \ln T$  plot from HW#4. Do you find any regions of your model star that are dominated by convection? If so, where are they? If not, why do you think your code didn't produce convection-dominated regions?
- 2) Compute the temperature above which partially ionized hydrogen will always be dynamically stable. In your solution, first create a plot of  $\gamma_a(T)$  versus  $T$  to prove that they are inversely proportional. Then solve for  $T$  by setting  $\gamma_a = 4/3$ , our stability criterion. What is your interpretation of the meaning of this temperature?
- 3) We had in class three reasons why convection may dominate over radiation for energy transport. Re-read this section of the Big Orange Book to argue for why the interior of massive stars, the outer layer of Solar mass stars, and the entirety of low mass stars is convective.