

Homework 2

1. French, 5-4, p. 160.
2. French, 5-18, p. 163. (Challenging.)
3. A star is known to be moving away from Earth at a speed of 4×10^4 m/s. This speed is determined by measuring the shift of the H_α line ($\lambda = 656.3$ nm). By how much and in what direction is the shift of the wavelength of the h_α line?
4. Draw a graph of the Lorentz factor $\gamma(v)$ versus speed v . Use 20 points or so between $v = 0.01c$ and $v = 0.99c$. The points need not be evenly spaced. A *smooth* line should join the points. Use any graphing program you want. Excel, gnuplot, mathematica, or Aunt Ida's jiffy plot are all fine.
5. The wavelength of a spectral line measured to be λ on Earth is found to increase by 50% on a far distant galaxy. What is the speed of the galaxy relative to Earth?
6. French, 5-13, p. 162.