The angular momentum of an object: $L = I\omega$, where I is the moment of inertia of the object and ω is the angular velocity (rad/sec).

1) Calculate the angular momentum of the Sun. $I = 0.059 \cdot M_\odot R_\odot^2$ and the Sun rotates once in 25.05 days.

2) Calculate the angular momentum of Jupiter going around the Sun. $I = M_{Jup} r^2$, where r = Jupiter's distance from the Sun. Make sure $R_\odot$ and r have the same units.

3) Calculate how long it would take the Sun to rotate, if all of Jupiter's angular momentum were added to the Sun.

HD 63454 is a K4V star ($M = 0.79\ M_\odot$) that is know to have a extra-solar planet in a circular orbit with a period of 2.81782 days. The planet produces a maximum reflex velocity of A = 64.3 m/s in the star.

4) Calculate the semi-major axis of the planets orbit [in AU].

5) Calculate the minimum mass of the planet (sin i = 1.0)

6) Calculate the total mass of material a 1 cm radius spherical particle at 1 AU from a 1 $M_\odot$ star runs into in one year going through a proto-planetary nebula with a density of 10^{-7} kg/m^3.

7) Calculate the final size, after a year, of that initial 1 cm radius particle if the individual particles in the proto-planetary nebula have a density of 1000 kg/m^3.

Please show all your work (including units) in as complete, concise, neat, and organized a manner as possible.

Due: Thur June 4th in class (−2% for every hour late)