Homework 13

Problem 1 (5 points)

In class, I misquoted the oscillation period of the Sun with respect to the galaxy disk. Calculate the correct value assuming that density 0.15 $M_\odot/(pc)^3$.

Problem 2 (5 points)

Using derivations of above problem, find the maximum deviation/height of the Sun above the galaxy disk median. Does the Sun belong to the thin or the thick disk? The current velocity of the Sun in direction away from the disk is $\omega_\odot = 7.2$ km/s and height above disk is $z_\odot = 30$ pc.

Problem 3 (5 points)

A neutron star with $R = 10$ km and mass $M = 2M_\odot$ has observed luminosity of $L_\odot$, assuming that we are far away from this star, what is its luminosity at the surface of the star.

Problem 4 (5 points)

Solve problem 17.4

Problem 5 bonus (5 points)

Calculate the time it takes a photon to travel from the Sun surface to infinity applying the metric change due to gravity. Does your result mean that the Sun is a black hole. Why so?