Homework 02

Problem 1 (5 points)

Atmosphere conditions allow only 0.25″ resolution. Is a $50 telescope with objective lens diameter of 20 cm much worse than a 10 m primary lens telescope from the practical resolution point of view. Why would we still invest in large Earth based telescopes?

Problem 2 (5 points)

What are the advantages of a space based telescope. Hint: it is not only in resolution.

Problem 3 (5 points)

Hanbury Brown and Twiss measured that they needed ≈ 10 m base line to bring intensity interferometer visibility to zero. Sirius Radius is 1.7 $R\odot$ and distance to it is 2.64 pc. Estimate the correlation time of the detected light.

Problem 4 (5 points)

Prove Kepler's third law for perfectly circular orbit around super massive point i.e. $P^2 = R^3$. Where P is the period of the orbital motion and R its radius.

Problem 5 (5 points)

You are building a telescope. Someone gave you the objective lens with diameter $D = 10$ cm, its focal length is $f_o = 75$ cm. Find the reasonable focal distance for your telescope eyepiece which gives you the maximum practically achievable angular resolution. What will be the magnification of your telescope under above conditions?