

## 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  $\approx 10$  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?