

Stars and Galaxies

Coursework Sheet 4

1. A pair of stars are observed to orbit one another on the sky in approximately face-on, circular orbits with a period of 30 years. The angular semi-major axes of each orbit are 1 and 3 arcseconds. Assuming the distance to be 5 pc, calculate the individual masses of the stars in solar masses. Estimate the distance out to which we can spatially resolve using current ground-based optical telescopes, binaries consisting of solar mass stars and periods within our lifetime.

(5 marks)

2. The spectral lines in a double-lined spectroscopic binary exhibit sinusoidal motion with amplitudes of 150 and 350 km s⁻¹ in a period of 8 hours. Assuming we view the system close to edge-on, calculate the individual masses in solar masses. What would you look for observationally to prove the system was close to edge-on?

(5 marks)