Observational Astrophysics 2, 2007: Exercises to Lecture 9

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1 Measuring Stellar Diameters and Limb Darkening

1.1 Visibility of Uniform Disk

Calculate the visibility of a uniform stellar disk with angular diameter α as a function of the ideal 2-element interferometer separation d at wavelength λ.

1.2 Fringes of Uniform Disk

Write a program to numerically calculate the visibility and the fringe pattern of a uniform stellar disk seen by an ideal 2-element interferometer as introduced above.

1.3 Different Stellar Diameters

Change the angular diameter of the stellar disk and calculate the change in the visibility.

1.4 Limb Darkening

Use the same program to determine the fringe pattern of a non-uniform stellar disk with an intensity profile of

$$I(r/R) = I_0(2 + 3\sqrt{1 - (r/R)^2})/5$$

1.5 Detecting Limb Darkening

Discuss how you would use an interferometer to determine the limb darkening.