

Physics 8012
Problem set 2, due on 9/17/08
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In the class, we have expressed the image magnification by a point lens as a function of the image position θ_I . Show that the same can be expressed instead as a function of the source position θ_S :

$$A = \left| \frac{1}{2} \pm \frac{2 + 4\theta_E^2/\theta_S^2}{4\sqrt{1 + 4\theta_E^2/\theta_S^2}} \right| \quad (1)$$

I am actually not 100% sure this is the correct expression, so be sure to check yourself. Show that the total magnification of the two images (i.e. the sum) is

$$A_{\text{total}} = \frac{1 + 2\theta_E^2/\theta_S^2}{\sqrt{1 + 4\theta_E^2/\theta_S^2}} \quad (2)$$

Is this number greater than or smaller than 1 in general? Do you find this troubling?