

GRAVITATIONAL LENSING

19 – ELLIPTICAL LENSES EXTERNAL PERTURBATIONS

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FROM SIE TO NIE

(SEE KORMANN, BARTELMANN & SCHNEIDER, 1994)

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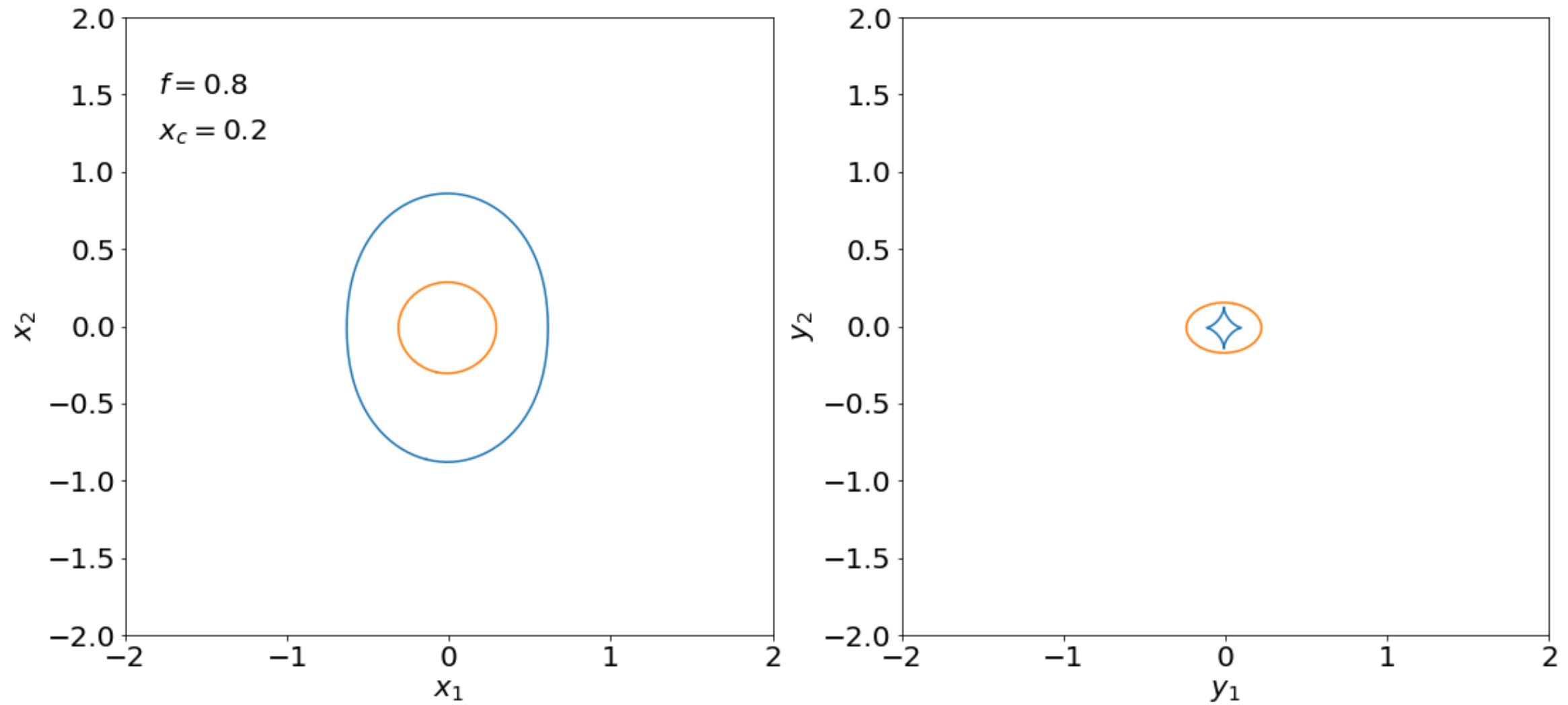
The SIE can be turned into a non-singular model by adding a core:

$$\Sigma(\vec{\xi}) = \frac{\sigma^2}{2G} \frac{\sqrt{f}}{\sqrt{\xi_1^2 + f^2 \xi_2^2 + \xi_c^2}}$$

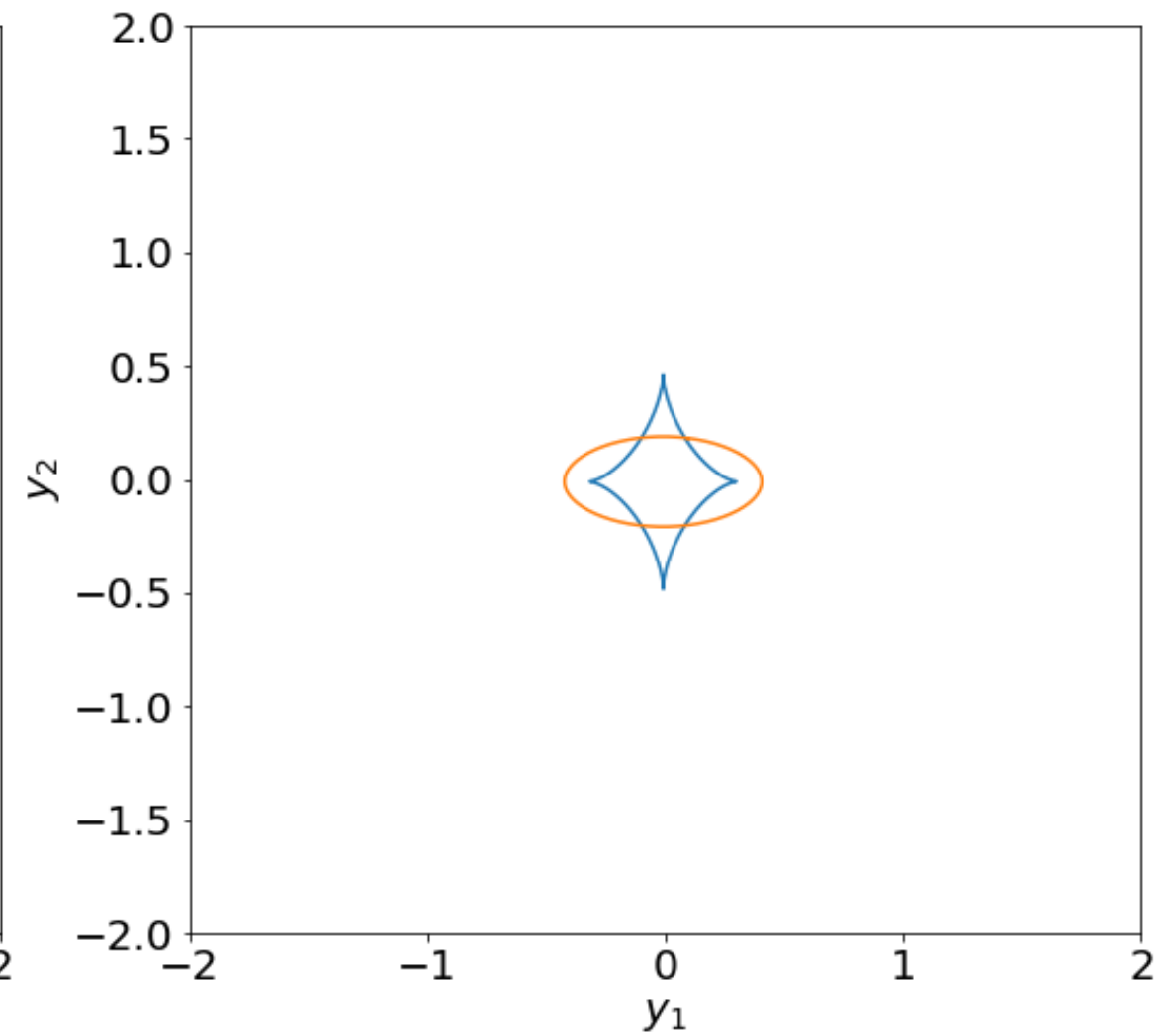
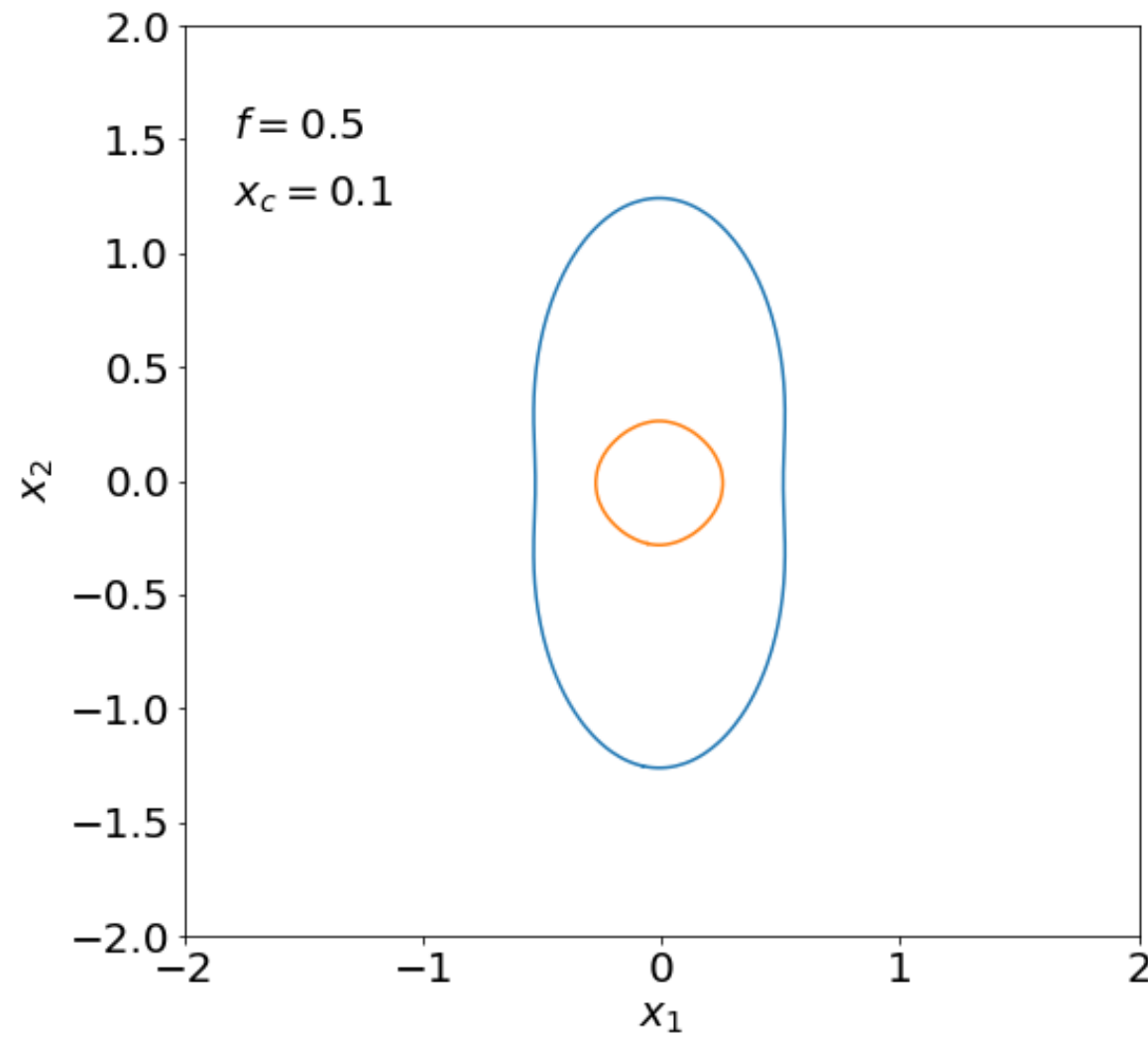
$$\kappa(\vec{x}) = \frac{\sqrt{f}}{2\sqrt{x_1^2 + f^2 x_2^2 + x_c^2}}$$

In this case, the analytical treatment of the lens is much more complicated. We limit the discussion to the topology of the critical lines and caustics and infer information about the image multiplicities...

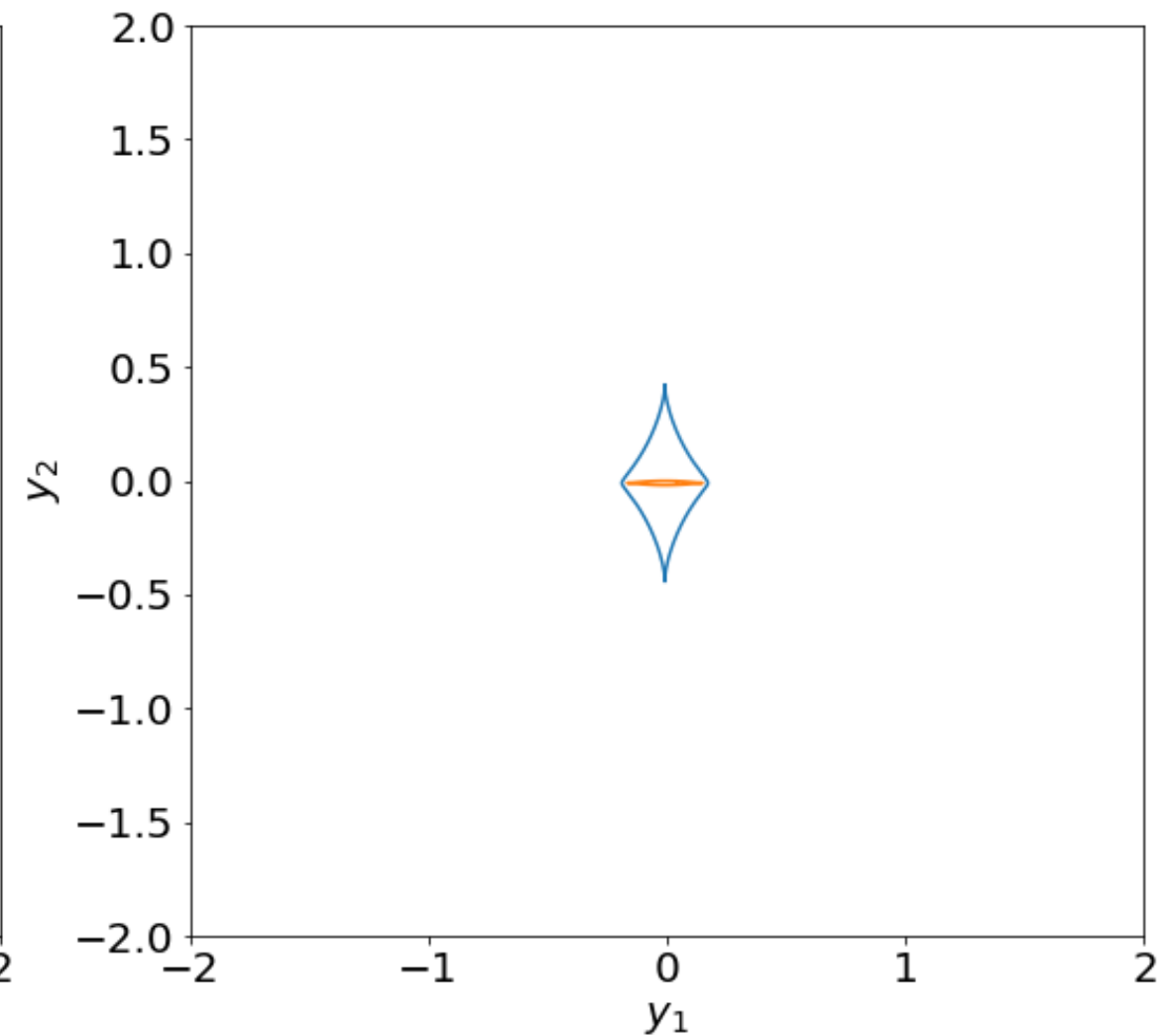
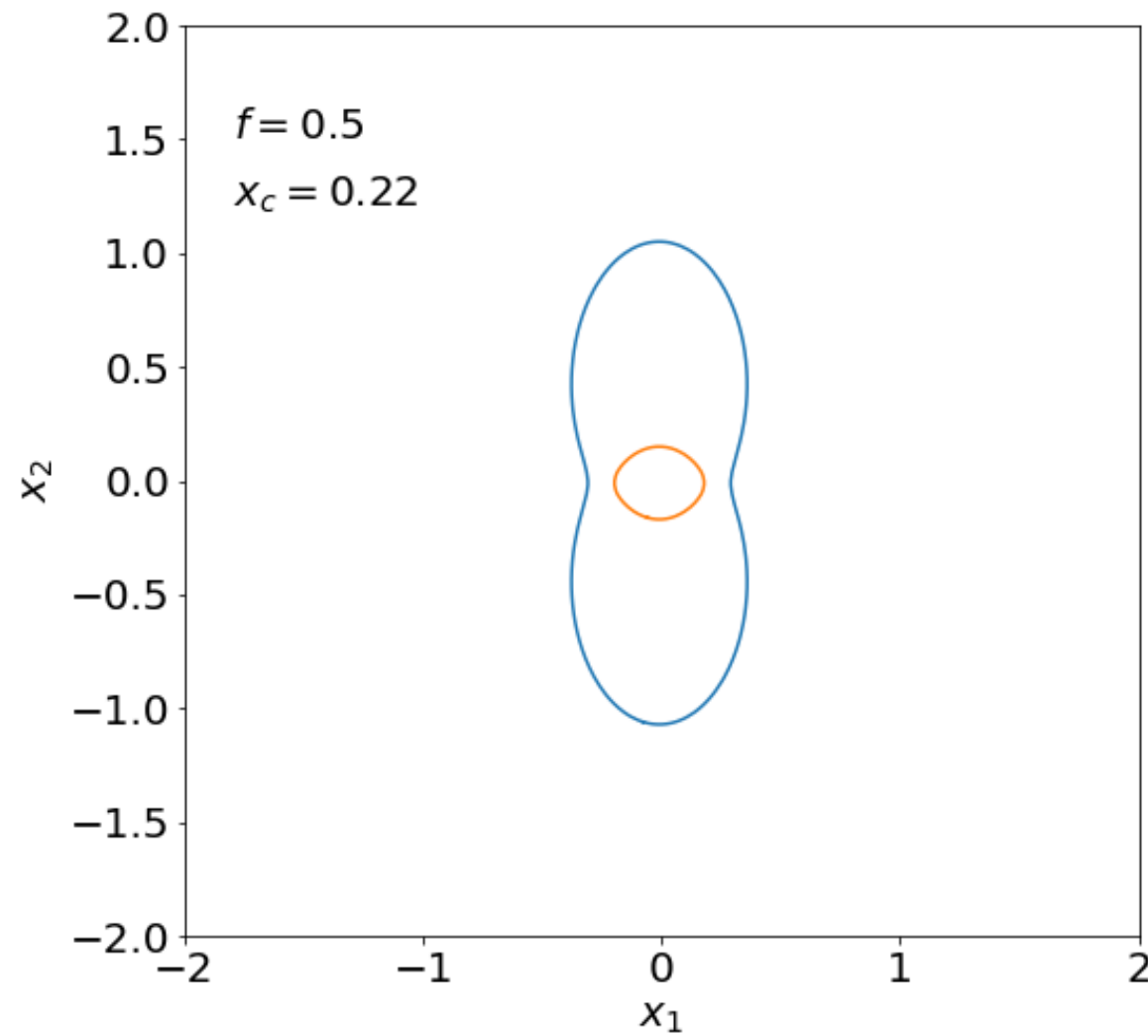
SMALL CORE RADIUS AND ELLIPTICITY



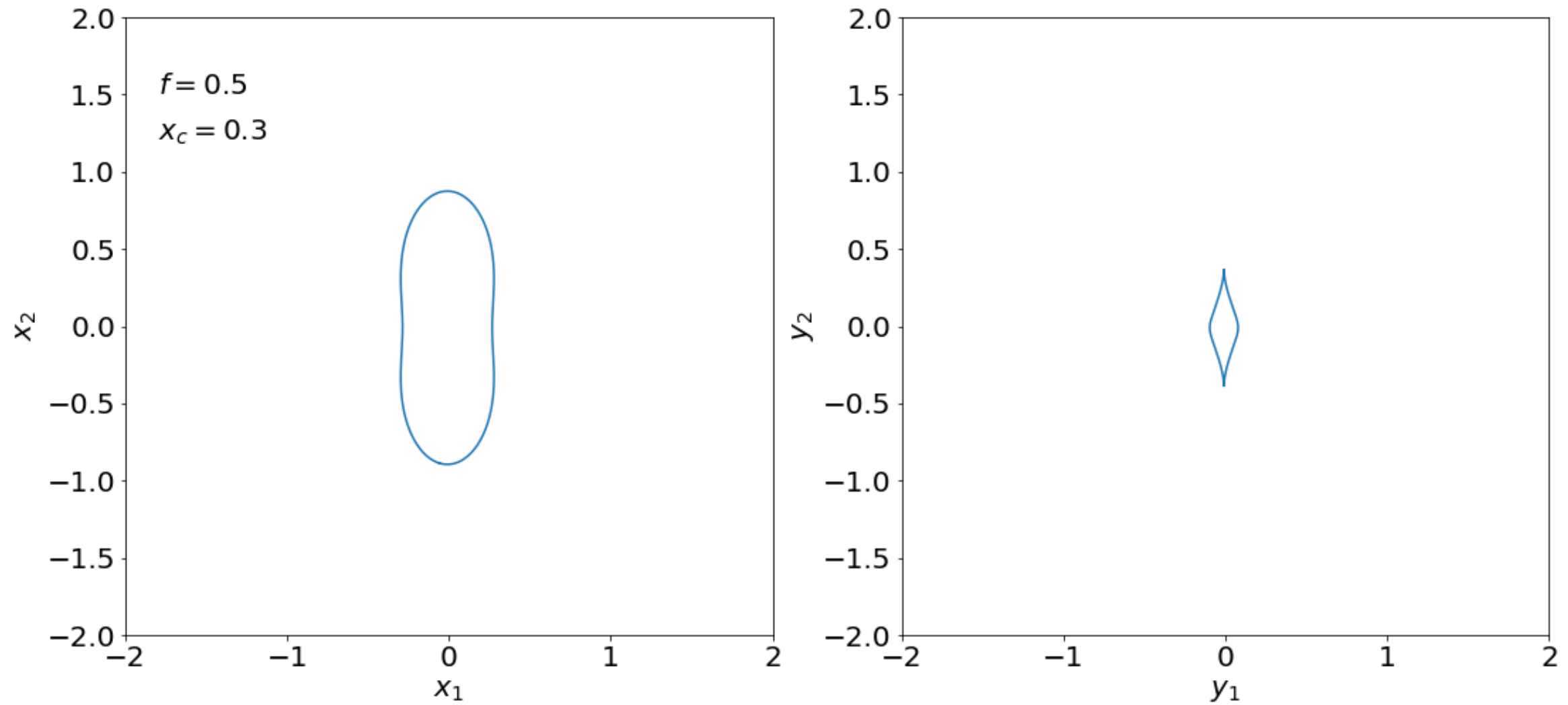
NAKED CUSP



INCREASING THE CORE SIZE...



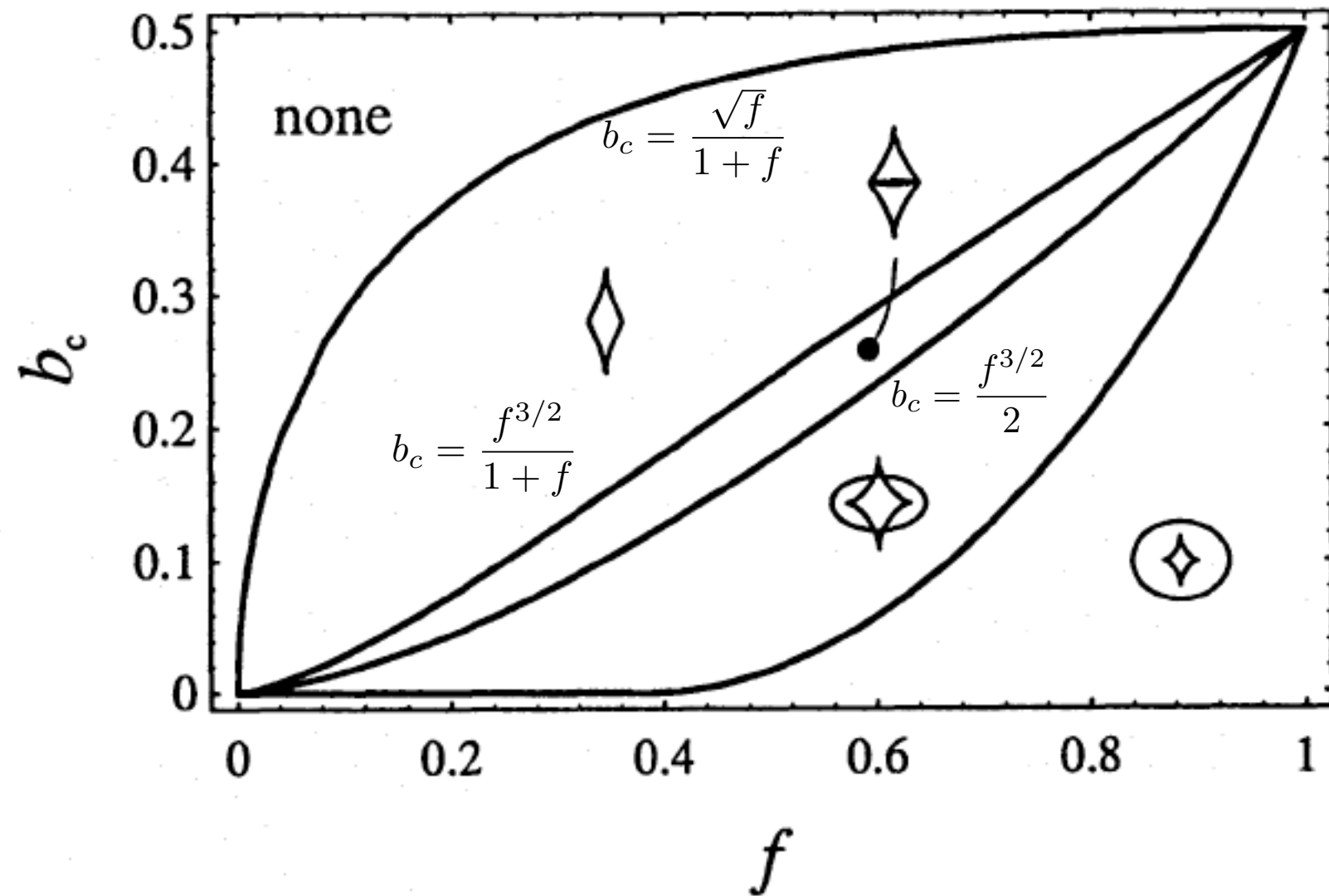
NO RADIAL CRITICAL LINE AND CAUSTIC



CAUSTIC TOPOLOGIES

(SEE KORMANN, BARTELMANN & SCHNEIDER, 1994)

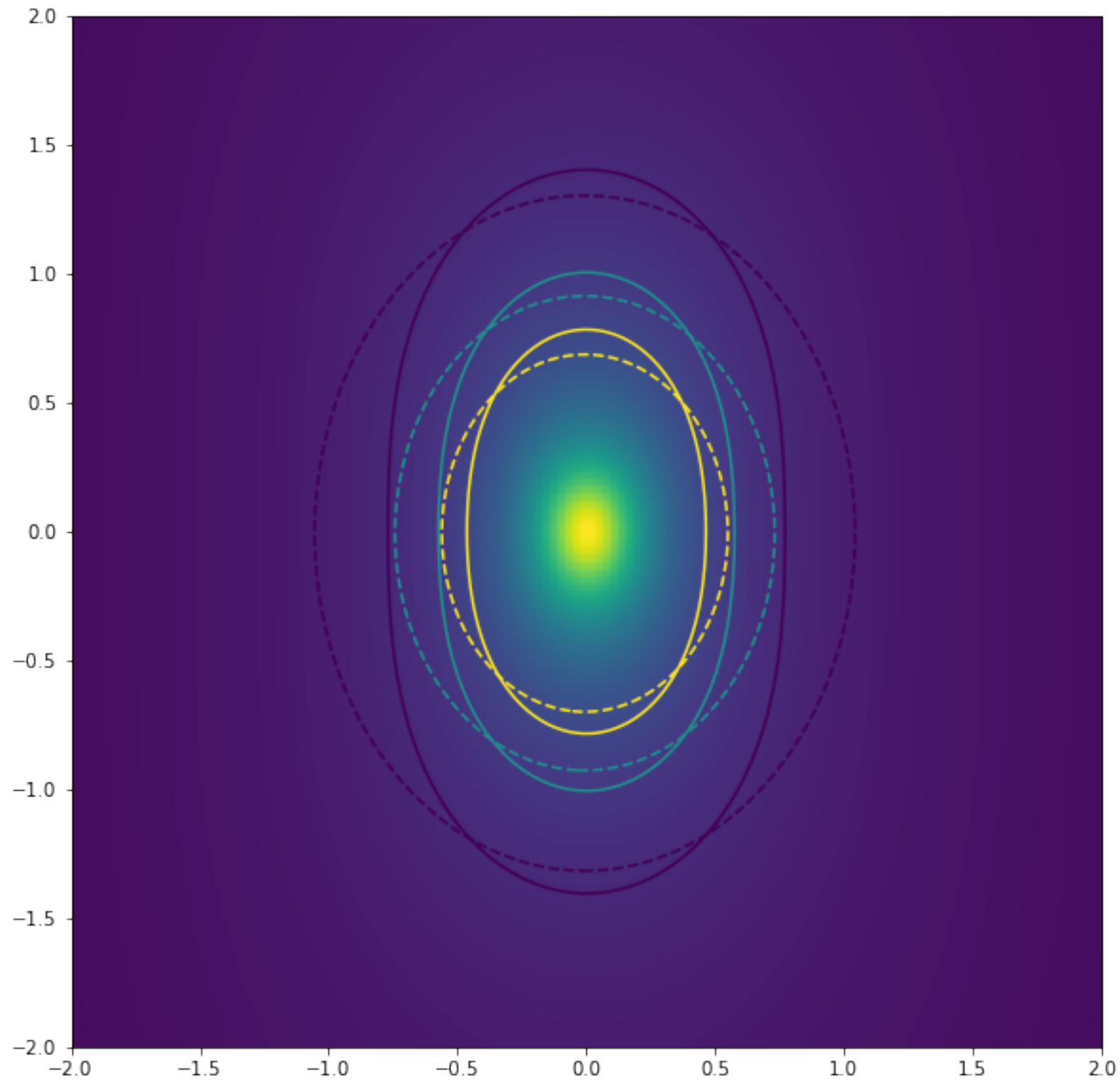
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PSEUDO-ELLIPTICAL MODELS

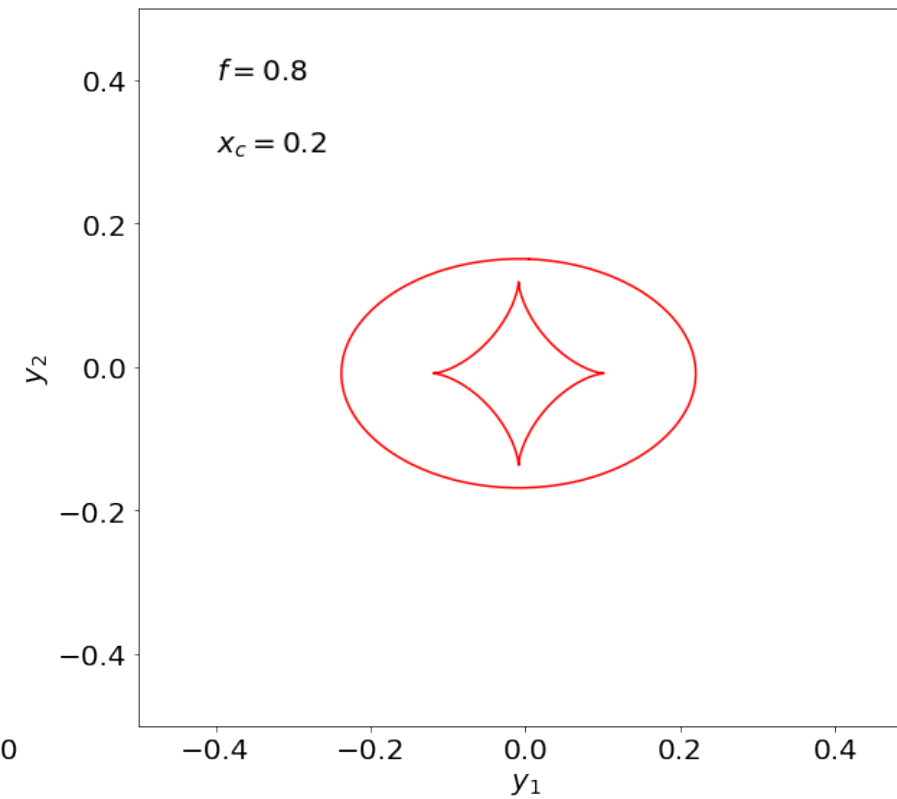
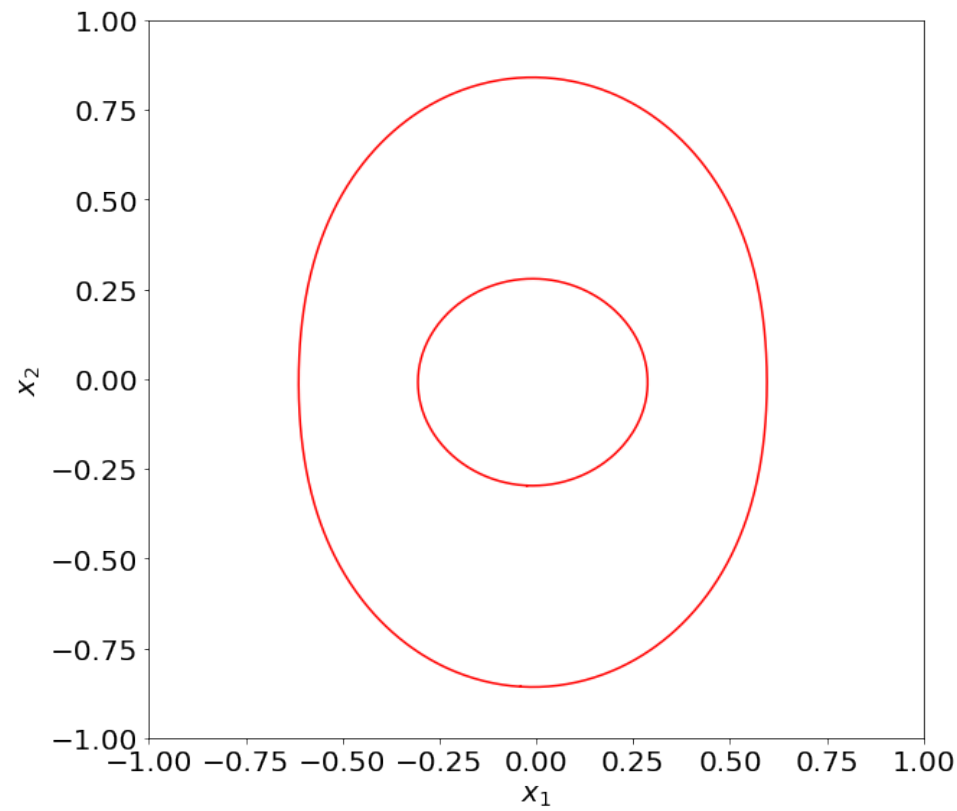
$$\psi(\vec{x}) = \sqrt{x_1^2 + f^2 x_2^2 + x_c^2}$$

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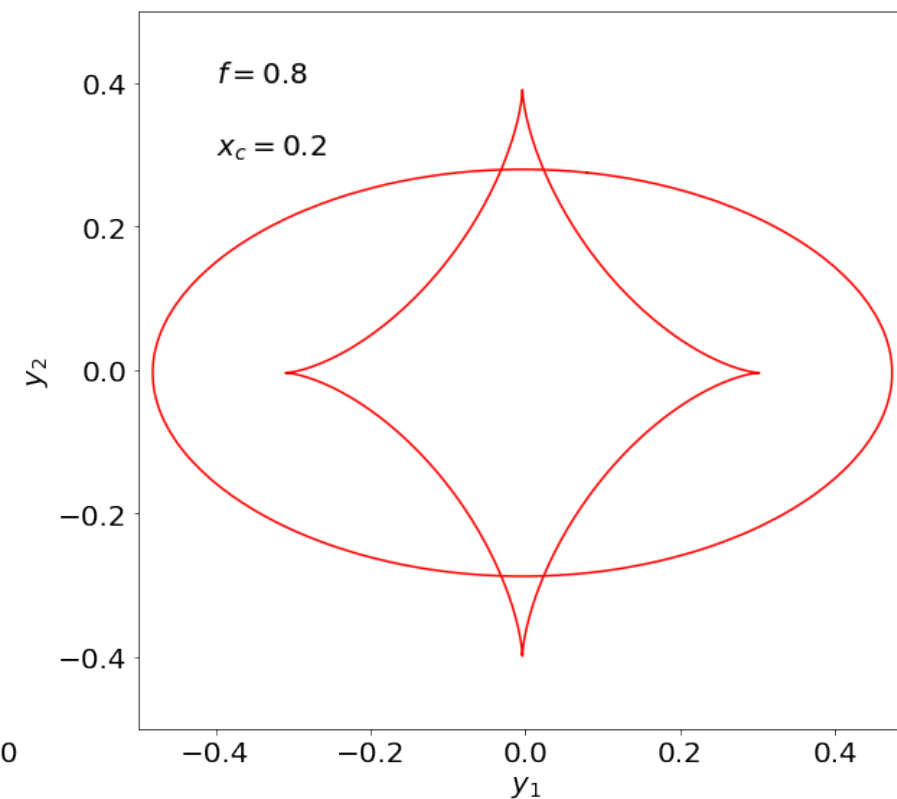
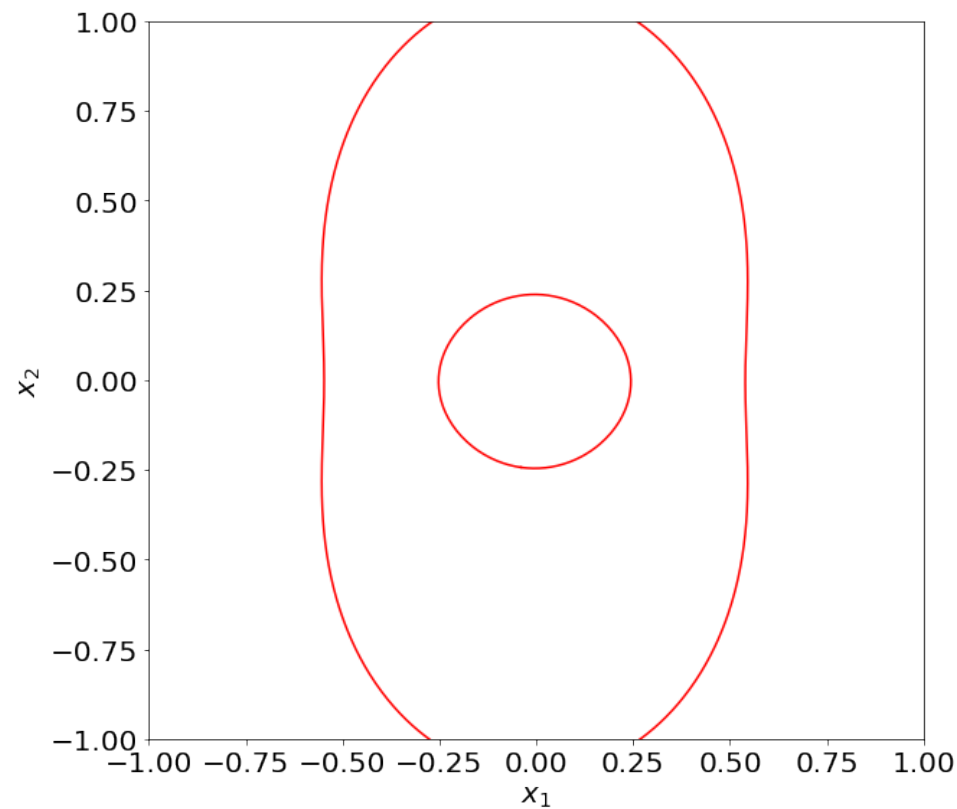


PSEUDO-ELLIPTICAL MODELS

NIE



PNIE



PSEUDO-ELLIPTICAL MODELS

