Classification of Critically Fixed Anti-Thurston Maps

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Gravitational Lenses

Hubble Space Telescope pictures of gravitational lenses
Critically Fixed Anti-Rational Maps: Beach Ball and Icosahedron

- Map each face anti-conformally to its complement, fixing vertices.
- Gives anti-rational maps of degree $\#\text{faces} - 1$. The vertices are fixed critical points.

Credit: Wikipedia
Anti-conformal maps from faces to complements do not match on the edges, resulting functions are not continuous.

What to do?

Introduce flexibility, use (anti-)Thurston maps
Critically fixed anti-rational map for the prism, with the 1-skeleton of the prism realized as the “Tischler graph”. Explicitly,

\[ f(z) = \frac{az^2}{\bar{z}^3 + 1} + \frac{b}{\bar{z}}, \]

\( a \approx 2.35, \ b \approx 0.0135. \)