Anisotropy-independent mass modeling

**Abstract:** We demonstrate both analytically and with available kinematic data that the mass-anisotropy degeneracy is effectively eliminated near the 3D deprojected half-light radius of spheroidal galaxies.

\[
M(< r; 0) - M(< r; \beta) = \frac{\beta(r) r \sigma^2(r)}{G} \left( \frac{\ln \rho}{\ln r} + \frac{\ln \sigma^2}{\ln r} + \frac{\ln \beta}{\ln r} + 3 \right)
\]

The above equation explains the plotted behavior that the effect of anisotropy on determining mass is minimized near the 3D deprojected half-light radius \( r_{1/2} \).

We derive the above mass errors by marginalizing over solutions to the spherical Jeans equation. We allow for non-constant anisotropy profiles, varying density profiles, and we incorporate the photometric errors. A pinch occurs in the same region as demonstrated in the left plot.

Approximation formula to determine dynamical mass within \( r_{1/2} \) tested for almost eight decades in mass. The insert shows that the formula is accurate to better than 10%.

M/L within \( r_{1/2} \) vs. \( M_{1/2} \). Systems on the curve lie in DM halos. The stars are GCs. Different feedback mechanisms cause differing slopes at each end.