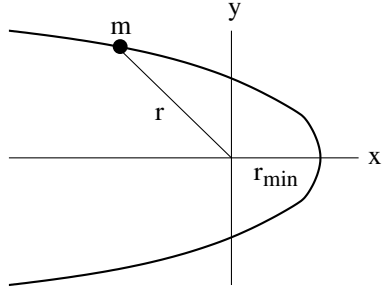


[mex234] Cometary motion on hyperbolic orbit

Determine a parametric representation $x(\xi), y(\xi), t(\xi), \vartheta(\xi)$ for the hyperbolic motion in time of a comet with mass m in the central force potential $V(r) = -\kappa/r$. Start from the orbital equation $r(\vartheta)$ from [msl23] and the general integral expression for $t(r)$ from [mln18]. Then use the parametrization $\tilde{a} + r = \tilde{a}e \cosh \xi$ with $\tilde{a} = \kappa/2E$ and $e^2 = 1 + 2E\ell^2/m\kappa^2$ with $E > 0$, as well as $p = \tilde{a}(e^2 - 1)$.



Solution: