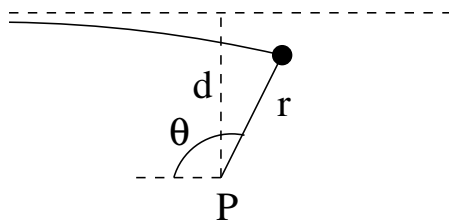


[mex41] In search of some hyperbolic orbit

A particle of unit mass ($m = 1$) moves from infinity along a straight line which, if continued, would allow it to pass a distance $d = b\sqrt{2}$ from a point P . Instead, the particle is attracted toward P by the central force $F(r) = -k/r^5$. If the angular momentum of the particle relative to P is $\ell = \sqrt{k}/b$, show that the orbit is $r(\theta) = b \coth(\theta/\sqrt{2})$.



Solution: