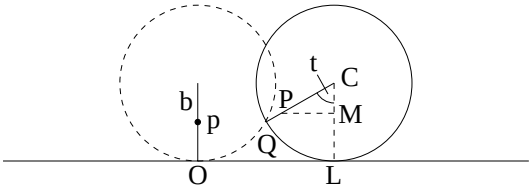
Question
A wheel of radius a and centre C rolls along a horizontal straight line without slipping. Find the parametric equation for the locus of a fixed point P on a spoke of the wheel at distance b from its centre. Take the x axis as the line through a low point of the curve and the parameter t as the angle PCA, where A is the point of contact of the wheel during the rolling.

Answer



We know: the arc $QL = at$ so $OL = at$ and $PM = b\sin t$ and $CM = b\cos t$
So the coordinates of P are

$$\begin{aligned} x &= at - b\sin t \\ y &= a - b\cos t \end{aligned}$$