Format for the Hypocycloid

We are going to need 3 different time variables

$t1 := 0, .1 .. 2\cdot\pi$ Gives the outer and inner circle

$t2 := 0, .1 .. \frac{FRAME}{10}$ generates the curve (the hypocycloid) traced out by the fixed point on the smaller circle

$t := \frac{FRAME}{10}$ gives just the center of the smaller circle and the fixed point on the circle

Define the radii of the inner and outer circle

$a := 3 \qquad b := 1$

Define the equations of the outer circle:

$x1(t1) := a\cdot\cos(t1) \qquad y1(t1) := a\cdot\sin(t1)$

Define the equations of the center of the inner circle

$x2(t) := (a - b)\cdot\cos(t) \qquad y2(t) := (a - b)\cdot\sin(t)$

Define the equations for the inner circle:

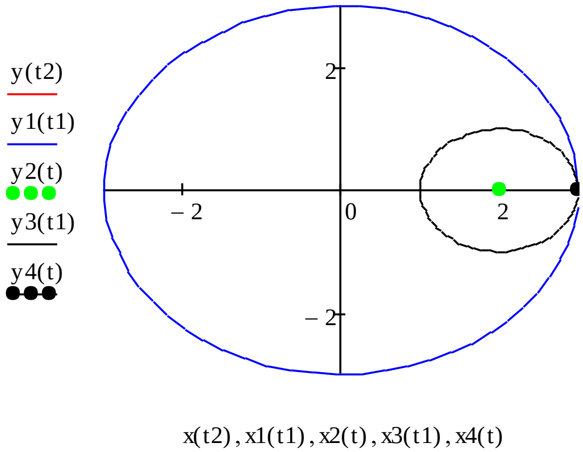
$x3(t1) := (a - b)\cdot\cos(t) + b\cdot\cos(t1) \qquad y3(t1) := (a - b)\cdot\sin(t) + b\cdot\sin(t1)$

Define the equations of the cycloid:

$x(t2) := (a - b)\cdot\cos(t2) + b\cdot\cos\left[t2\cdot\left(\frac{a}{b} - 1\right)\right] \qquad y(t2) := (a - b)\sin(t2) - b\cdot\sin\left[\left(\frac{a}{b} - 1\right)\cdot t2\right]$

Define the equations of the fixed point on the circle:

$x4(t) := (a - b)\cdot\cos(t) + b\cdot\cos\left[t\cdot\left(\frac{a}{b} - 1\right)\right] \qquad y4(t) := (a - b)\cdot\sin(t) - b\cdot\sin\left[t\cdot\left(\frac{a}{b} - 1\right)\right]$



The actual format would look like:

$t1 := 0, .1 .. 2\cdot\pi \qquad t2 := 0, .1 .. \frac{FRAME}{10} \qquad t := \frac{FRAME}{10}$

$a := 3 \qquad b := 1$

$x1(t1) := a\cdot\cos(t1) \qquad y1(t1) := a\cdot\sin(t1)$

$x2(t) := (a - b)\cdot\cos(t) \qquad y2(t) := (a - b)\cdot\sin(t)$

$x3(t1) := (a - b)\cdot\cos(t) + b\cdot\cos(t1) \qquad y3(t1) := (a - b)\cdot\sin(t) + b\cdot\sin(t1)$

$x(t2) := (a - b)\cdot\cos(t2) + b\cdot\cos\left[t2\cdot\left(\frac{a}{b} - 1\right)\right] \qquad y(t2) := (a - b)\sin(t2) - b\cdot\sin\left[\left(\frac{a}{b} - 1\right)\cdot t2\right]$

$x4(t) := (a - b)\cdot\cos(t) + b\cdot\cos\left[t\cdot\left(\frac{a}{b} - 1\right)\right] \qquad y4(t) := (a - b)\cdot\sin(t) - b\cdot\sin\left[t\cdot\left(\frac{a}{b} - 1\right)\right]$

For Integer values of a and b use 63 frames (corresponds to 2π)