\[ ndot := n\left(\frac{xn}{1+n} - 1 - n\right) \]

\[ \text{solve}(ndot=0, n); \]

\[ 0, \frac{x}{2} - 1 + \frac{\sqrt{x^2 - 4x}}{2}, \frac{x}{2} - 1 - \frac{\sqrt{x^2 - 4x}}{2} \]

\[ a := x -> \frac{1}{2}x - 1 + \frac{1}{2}\sqrt{x^2 - 4x} \]

\[ b := x -> \frac{1}{2}x - 1 - \frac{1}{2}\sqrt{x^2 - 4x} \]

\[ \text{plot}(a(x), x=0..7); \] # note that there are no real valued solutions of \( a(x) \), if \( 0 < x < 4 \)

\[ \text{plot}(b(x), x=0..7); \]
\begin{verbatim}
> c:=plot(a(x),x=0..7):
> d:=plot(b(x),x=0..7):
> with(plots):
> display({c,d});  #combines plots of a(x) and b(x)
\end{verbatim}
with(plots):
contourplot(ndot, x=2..7, n=0..5, contours=[0], filled=true, coloring=[red, green], grid=[100, 100], axes=boxed);  #note how we don't need any of the previous calculations to make this plot, only the resident dynamics). In the green area we have ndot>0 and in the red ndot<0. Hence the upper curve is attracting and the lower repelling. So, if we take a fixed value of x, say x=6, we have convergence to a positive equilibrium density, if we start above the Allee threshold given by the lower curve. 
subs(m=0,n=a(x), (y*(n+m)/(1+n+m)-1-(m+exp(y-x)*n)))

> dynamics, set (substitute) mutant density to zero and resident density to the equilibrium density. Here it is reasonable to pick the stable equilibrium density.

\[
\frac{y\left(\frac{x}{2} - 1 + \frac{\sqrt{x^2 - 4x}}{2}\right)}{x + \sqrt{x^2 - 4x}} - 1 - e^{(y-x)}\left(\frac{x}{2} - 1 + \frac{\sqrt{x^2 - 4x}}{2}\right)
\]

> s := (x,y) \rightarrow y*(1/2*x-1+1/2*(x^2-4*x)^(1/2))/(1/2*x+1/2*(x^2-4*x)^(1/2))-1-exp(y-x)*(1/2*x-1+1/2*(x^2-4*x)^(1/2))

> contourplot(s(x,y),x=0..7,y=0..7,contours=[0],filled=true,colors=[red,green],grid=[100,100],axes=boxed); #PIP