# ⊟ Cykloida

Kotálí-li se kružnice bez smyku po přímce opisuje její pevně zvolený bod křivku zvanou cykloida. Situace je na obrázku (pevně zvolený bod je A, červená je cykloida).

```
> cyk7:=plot([t+cos(t),1-sin(t),t=0..10],color=red):
  kruz7:=plottools[circle]([Pi,1],1):
  bod7:=plottools[point]([Pi-1,1],symbol=circle,color=black):
  sip:=plottools[arrow]([Pi,1],[2,0],0, 0.1,0.1):
  popis7:=plots[textplot]([5.21,0.70,`Směr pohybu`]):
  popis71:=plots[textplot]([1.9,1.2,`A`]):
  plots[display]({cyk7,kruz7,bod7,sip,popis7,popis71},scaling=c
  onstrained);
```
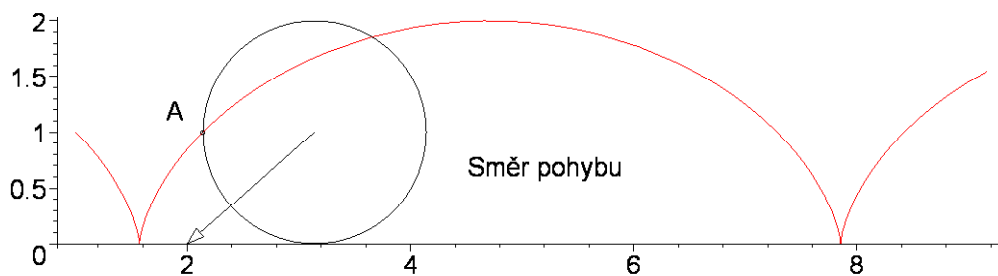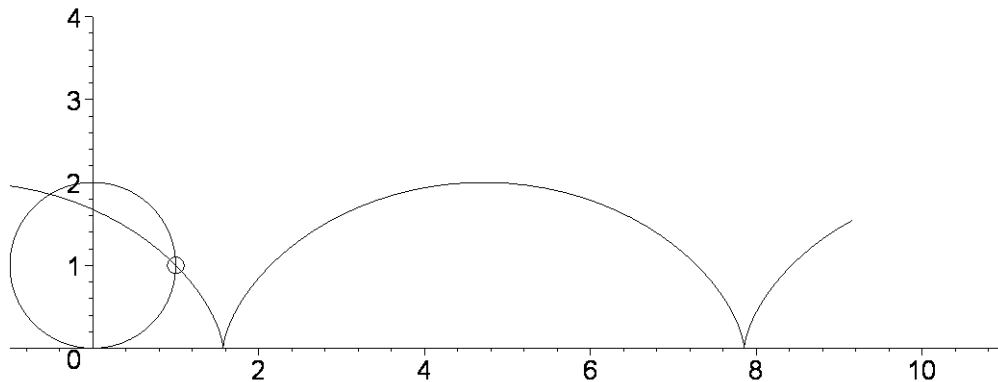


```
> with(plots);
```

[*animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d,*

  conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot,

  display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, graphplot3d,

  implicitplot, implicitplot3d, inequal, interactive, interactiveparams, intersectplot,

  listcontplot, listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot,

  matrixplot, multiple, odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot,

  polygonplot, polygonplot3d, polyhedra_supported, polyhedraplot, rootlocus, semilogplot,

Snadno se odvodí, že parametrické vyjádření cykloidy je: $y = 1 - \sin(t)$; $x = t + \cos(t)$.

Předchozí obrázek nyní "rozhýbu": (d7 značí délku x-ové trajektorie kružnice).

```
> d7:=10:

> animate(
  {[x+cos(x),1-sin(x),x=-Pi/2..d7],
  [cos(t)+u,sin(t)+1,t=0..2*Pi],
  [u+cos(u)+0.1*cos(t),1-sin(u)+0.1*sin(t),t=0..2*Pi]},
  u=0..d7,
  view=[-1..d7+1,0..4],
  color=black,
  numpoints=100,
  frames=100,
  scaling=constrained);
```



```
>

> [ animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d,
  conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot,
  display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, graphplot3d, implicitplot,
  implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot,
```

listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple, odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d, polyhedra_supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions, setoptions3d, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot]

>