

```

> with(plots):
with(DEtools):
> phug:=R->[diff(theta(t),t) = (v(t)^2 - cos(theta(t)))/(v(t)),
diff(v(t),t) = -sin(theta(t))-R*v(t)^2];

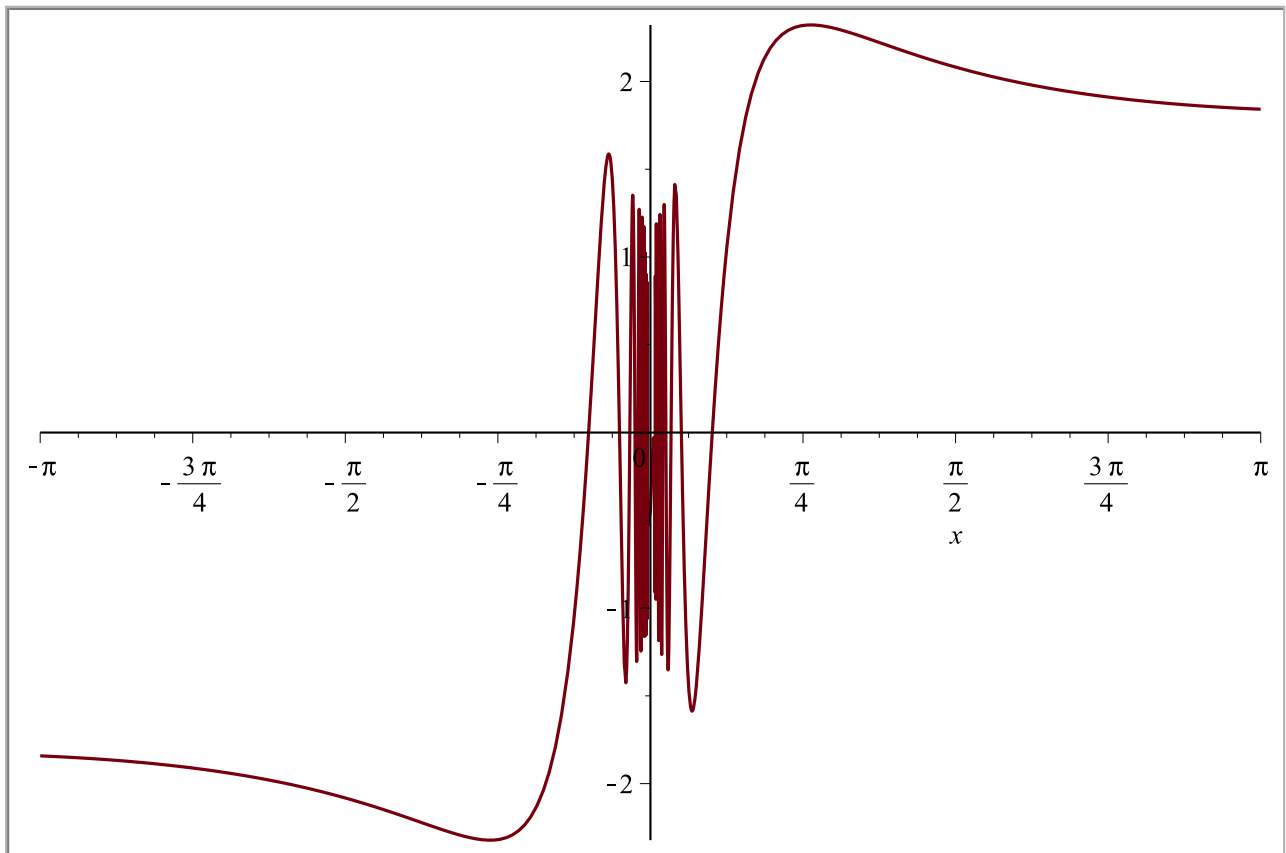
```

$$phug := R \rightarrow \left[ \frac{d}{dt} \theta(t) = \frac{v(t)^2 - \cos(\theta(t))}{v(t)}, \frac{d}{dt} v(t) = -\sin(\theta(t)) - R v(t)^2 \right] \quad (1)$$

```

>
>

```



```

exp(sqrt(|x|)) * sin(1/x)

```

Plot the thing

$$\sin\left(\frac{1}{x}\right)$$

↩

```

>
>
>

```

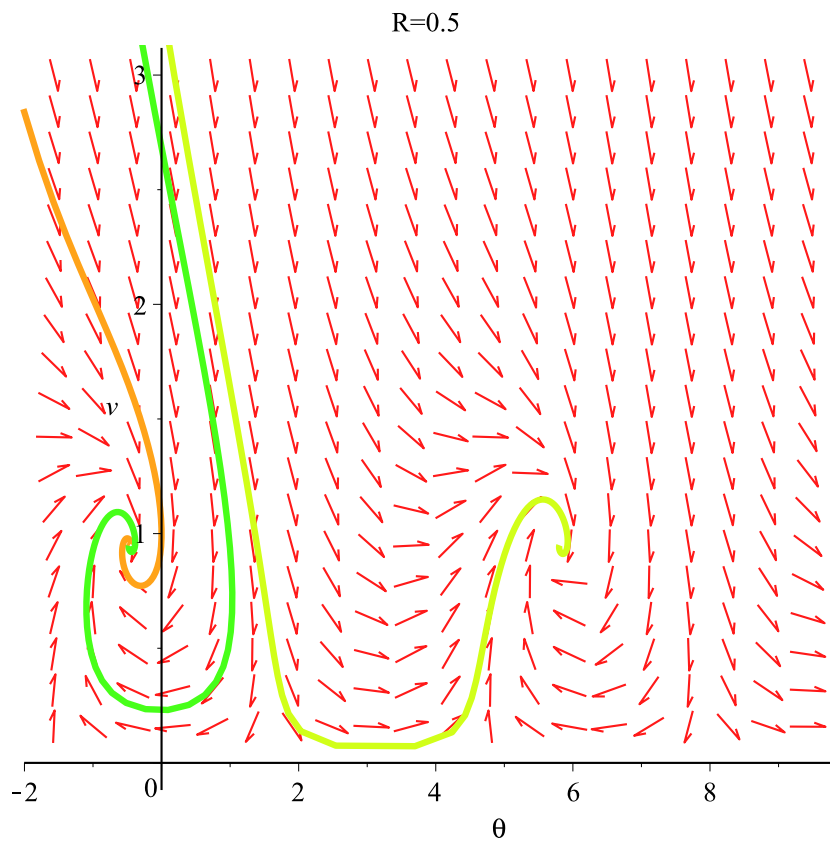
```

> DoThePhug:=proc(Pts, R, {tmax:=8})
local i, inits, cols;
inits:=[seq([theta(0)=Pts[i][1], v(0)=Pts[i][2]],
1..nops(Pts))];
cols:=[seq(COLOR(HUE,i/10),i=1..nops(Pts))];
DEplot(phug(R), [theta, v], t=-tmax..tmax,

```

```
inits, theta=-Pi/2..3*Pi, v=0..3,  
linecolor=cols, numpoints=200,  
obsrange=false,title=typeset("R=",R));  
end:
```

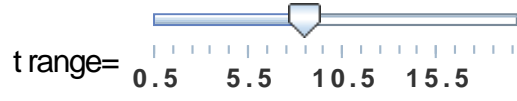
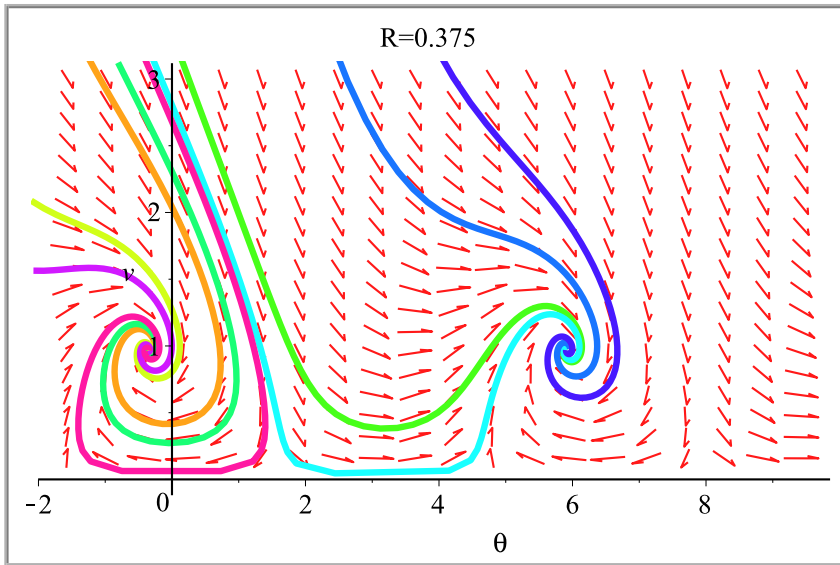
```
> DoThePhug([[0,1], [0.3, 2.8], [-.2,3]], 0.5);
```



```
> L:=[];
```

$L := [ ]$

(3)



[ > L;

[]

(4)