

Maple Worksheet: Section 2.1, Exercises 1 and 11 (try 3 on your own!)

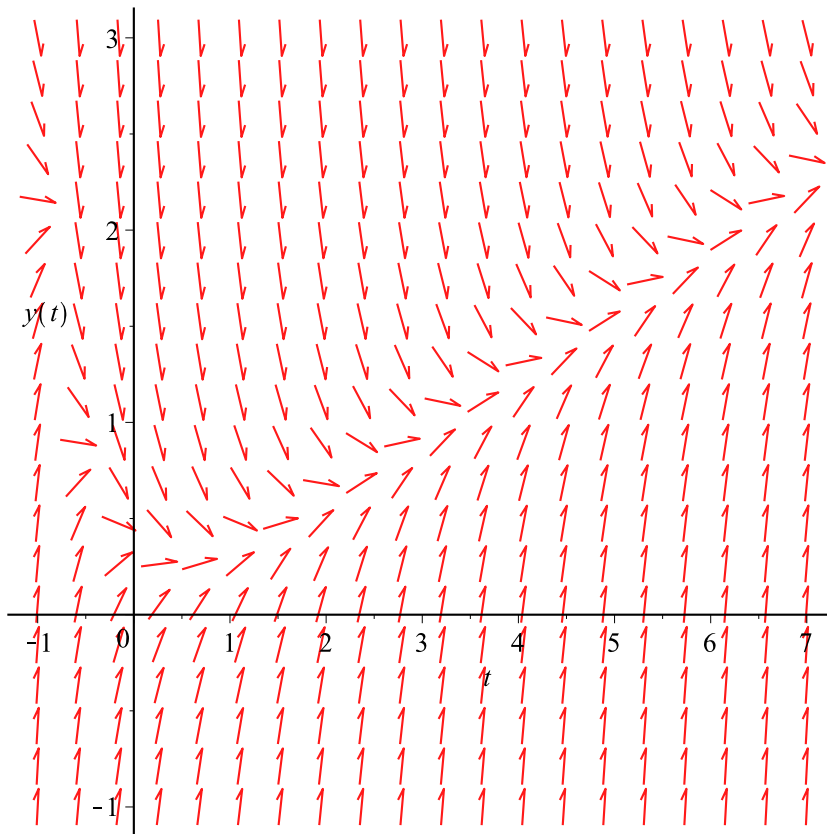
```
> # These commands are needed to use extra functionality:  
with(DEtools):  
with(plots):
```

```
> # Exercise 1: First define the differential equation, then plot  
and solve  
Eqn1:=diff(y(t),t)+3*y(t)=t+exp(-2*t);
```

$$Eqn1 := \frac{d}{dt} y(t) + 3y(t) = t + e^{-2t}$$

(1)

```
> DEplot(Eqn1,y(t),t=-1..7,y=-1..3);
```



```
> Soln1:=dsolve(Eqn1,y(t));
```

$$Soln1 := y(t) = \frac{1}{3} t - \frac{1}{9} + e^{-2t} + e^{-3t} _C1$$

(2)

```
> # Exercise 11 (optional). Same commands as before.  
Eqn11:=diff(y(t),t)+y(t)=5*sin(2*t);
```

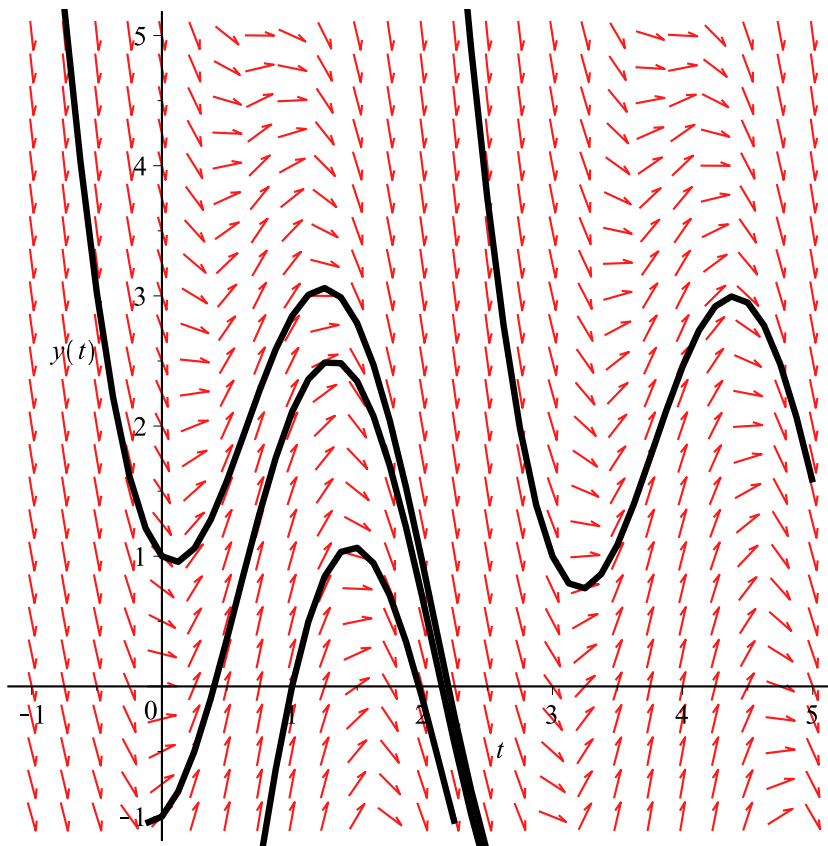
$$Eqn11 := \frac{d}{dt} y(t) + y(t) = 5 \sin(2t)$$

(3)

```
> initconds:=[y(0)=1,y(0)=-1,y(1)=0,y(3)=1];
```

```
DEplot(Eqn11,y(t),t=-1..5,y=-1..5,initconds,dirfield=[25,25],
linecolor=black);
```

```
initconds := [y(0) = 1, y(0) = -1, y(1) = 0, y(3) = 1]
```



```
> dsolve(Eqn11,y(t));
```

$$y(t) = -2 \cos(2 t) + \sin(2 t) + e^{-t} _C1$$

(4)

```
> # For the other exercises, you can check your work. Here's
Exercise 13:
```

```
> dsolve(diff(y(t),t)-y(t)=2*t*exp(2*t),y(t));
```

$$y(t) = (2 (-1 + t) e^t + _C1) e^t$$

(5)