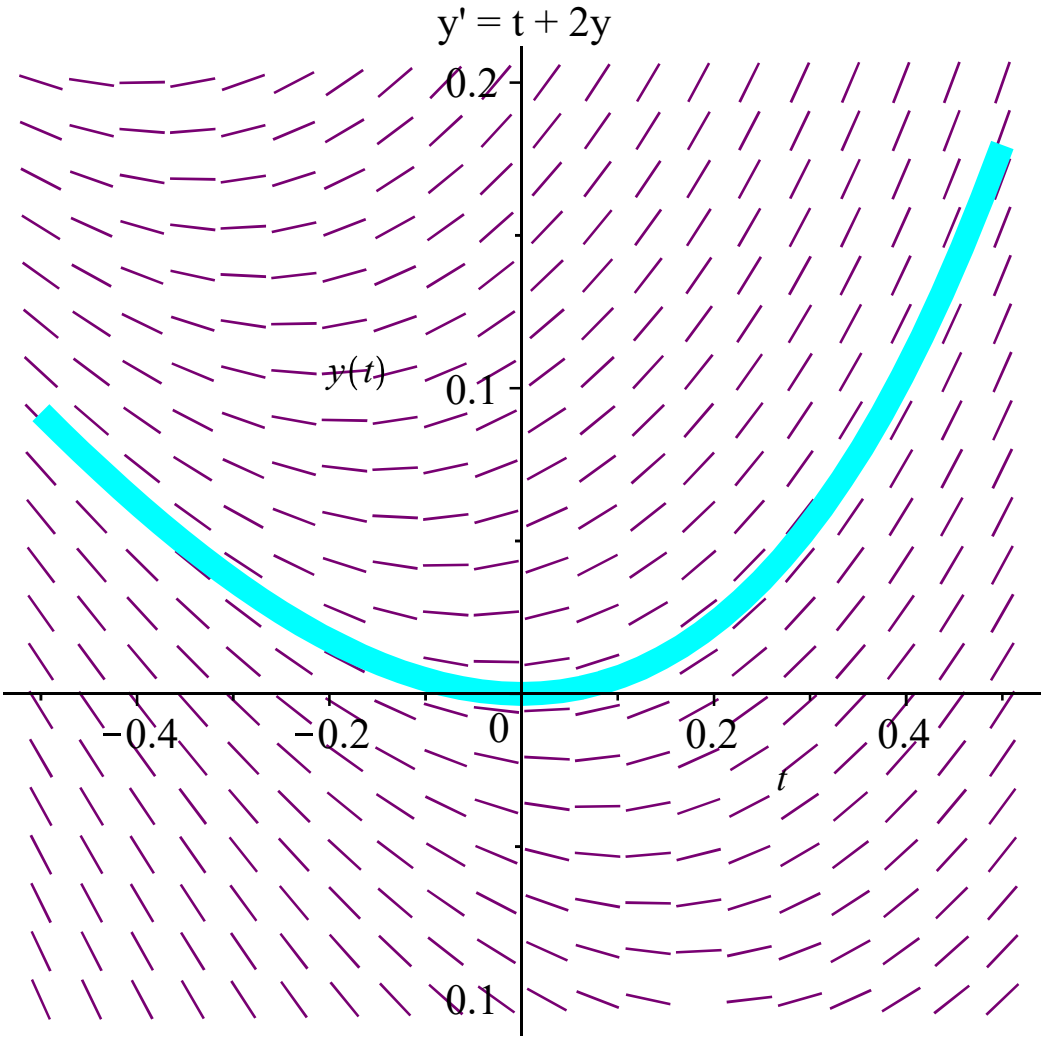
Approximating soln to y' = t + 2y, y(0) = 0 using slope field.

```
> with( DEtools, odeadvisor ) :
> with( plots ) :
> ode1 := diff( y(t), t ) = t + 2*y(t);
```

$$ode1 := \frac{d}{dt} y(t) = t + 2\,y(t) \qquad (1)$$

```
> DEplot(ode1, [y(t)], t=-0.5..0.5, y=-0.1..0.2, arrows=LINE, color=purple, title
    ="y' = t + 2y", {[0, 0]}, thickness=9, linecolor=cyan );
```



Approximating soln to y' = t + 2y, y(0) =0 using Picard's iteration method.

```
> odeadvisor(ode1, y(t))
```

$$odeadvisor\left(\frac{d}{dt}y(t) = t + 2y(t), y(t)\right) \tag{2}$$

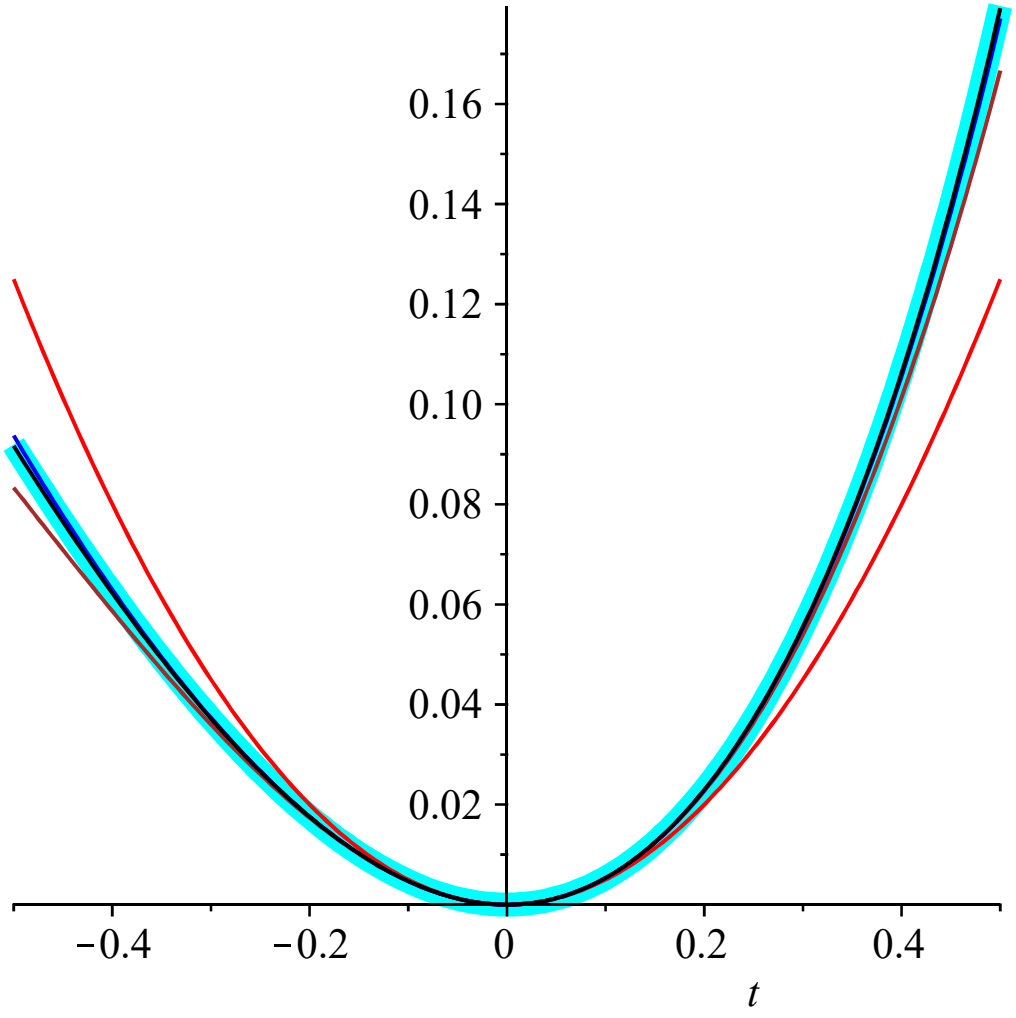
```
> dsolve(ode1, y(t));
```

$$y(t) = -\frac{t}{2} - \frac{1}{4} + e^{2t}\_C1 \tag{3}$$

```
> ans := rhs(dsolve({ode1, y(0) = 0}));
```

$$ans := -\frac{t}{2} - \frac{1}{4} + \frac{e^{2t}}{4} \tag{4}$$

```
> plots[multiple](plot, [ans, t = -0.5..0.5, thickness = 9, color = cyan], [t^2/2, t = -0.5..0.5, color
  = red], [t^2/2 + t^3/3, t = -0.5..0.5, color = brown], [t^2/2 + t^3/3 + t^4/6, t = -0.5..0.5, color = blue],
  [t^2/2 + t^3/3 + t^4/6 + t^5/15, t = -0.5..0.5, color = black])
```



Approximating soln to y'' - y = 4t, y(0) = 1, y'(0) = 2 using series approximation (ch 5).

```
> ans := -4 ·t - 5 exp(-t)/2 + 7 exp(t)/2
```

$$ans := -4\,t - \frac{5\,e^{-t}}{2} + \frac{7\,e^{t}}{2} \tag{5}$$

```
> plots[multiple](plot, [ans, t=-2..2, thickness=9, color=cyan], [1, t=-5..5, color=red], [1
  + 2 t, t=-5..5, color=brown], [1 + 2 t + t^2/2, t=-5..5, color=blue], [1 + 2 t + t^2/2 + t^3, t
  =-2..2, color=black], [1 + 2 t + t^2/2 + t^3 + t^4/24, t=-2..2, color=orange], [1 + 2 t
  + t^2/2 + t^3 + t^4/24 + 6 t^5/120, t=-2..2, color=pink])
```