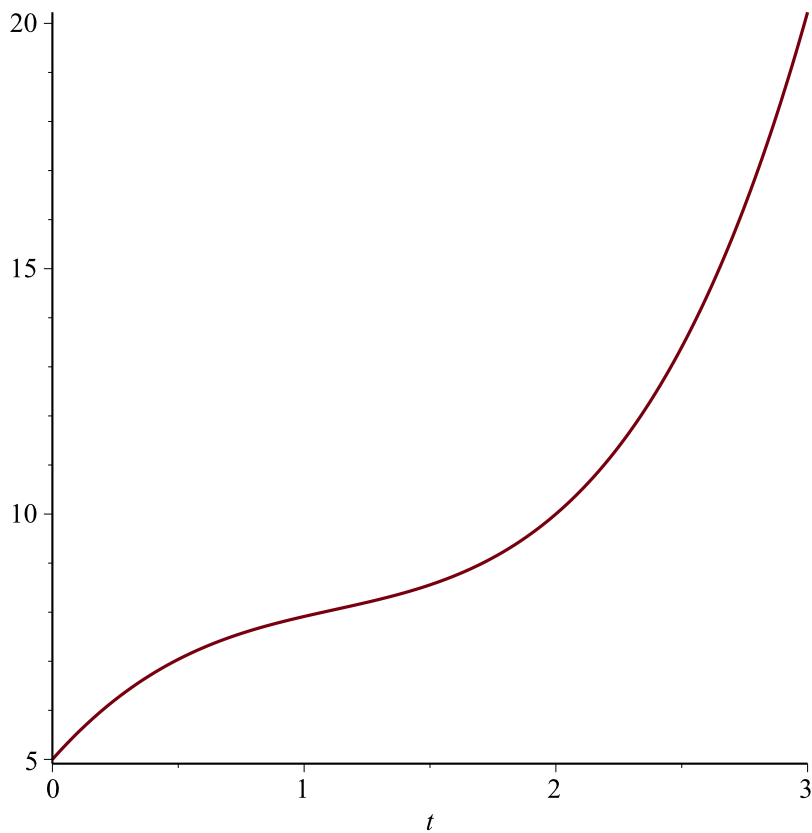


```

> restart
> Ecua := diff(y(t), t$2) + diff(y(t), t) + y(t) = 3*exp(t)
      Ecua :=  $\frac{d^2}{dt^2} y(t) + \frac{d}{dt} y(t) + y(t) = 3 e^t$  (1)
> Cond := y(0) = 5, D(y)(0) = a
      Cond := y(0) = 5, D(y)(0) = a (2)
> with(inttrans) :
> EcuaTrans := subs(Cond, laplace(Ecua, t, s))
      EcuaTrans :=  $s^2 \text{laplace}(y(t), t, s) - a - 5s + s \text{laplace}(y(t), t, s) - 5 + \text{laplace}(y(t), t, s)$ 
      =  $\frac{3}{s-1}$  (3)
> SolTrans := isolate(EcuaTrans, laplace(y(t), t, s))
      SolTrans :=  $\text{laplace}(y(t), t, s) = \frac{\frac{3}{s-1} + a + 5s + 5}{s^2 + s + 1}$  (4)
> SolPart := invlaplace(SolTrans, s, t)
      SolPart :=  $y(t) = e^t + \frac{2}{3} \left( 6 \cos\left(\frac{1}{2} \sqrt{3} t\right) + \sin\left(\frac{1}{2} \sqrt{3} t\right) \sqrt{3} (1+a) \right) e^{-\frac{1}{2} t}$  (5)
> Parametro := isolate(subs(t=2, rhs(SolPart) = 10), a); evalf(%, 3)
      Parametro :=  $a = \frac{1}{3} \frac{\left( \frac{3}{2} \frac{10 - e^2}{e^{-1}} - 6 \cos(\sqrt{3}) \right) \sqrt{3}}{\sin(\sqrt{3})} - 1$ 
      a = 5.79 (6)
> SolPartFinal := subs(a = rhs(Parametro), SolPart); evalf(%, 3)
      SolPartFinal :=  $y(t) = e^t + \frac{2}{3} \left( 6 \cos\left(\frac{1}{2} \sqrt{3} t\right) + \frac{\sin\left(\frac{1}{2} \sqrt{3} t\right) \left( \frac{3}{2} \frac{10 - e^2}{e^{-1}} - 6 \cos(\sqrt{3}) \right)}{\sin(\sqrt{3})} \right) e^{-\frac{1}{2} t}$ 
       $y(t) = e^t + 0.667 (6. \cos(0.865 t) + 11.8 \sin(0.865 t)) e^{-0.500 t}$  (7)
> CompUno := eval(subs(t=0, SolPartFinal))
      CompUno := y(0) = 5 (8)
> CompDos := eval(subs(t=2, SolPartFinal))
      CompDos := y(2) = 10 (9)
> CompTres := simplify(eval(subs(y(t) = rhs(SolPartFinal), lhs(Ecua) - rhs(Ecua) = 0)))
      CompTres := 0 = 0 (10)
> plot(rhs(SolPartFinal), t = 0..3)

```



```
> expand(evalf(SolPartFinal, 3))
```

$$y(t) = e^t + 4.002 e^{-0.500 t} \cos(0.865 t) + 7.8706 e^{-0.500 t} \sin(0.865 t) \quad (11)$$

```
> SolUno := y(t) = exp(t)
```

$$SolUno := y(t) = e^t \quad (12)$$

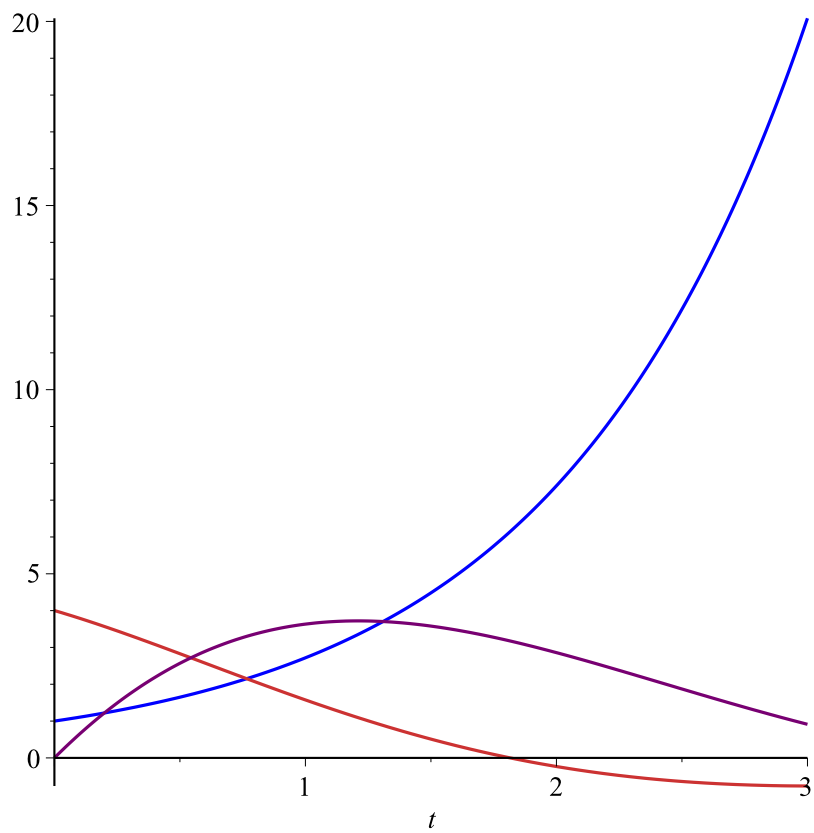
```
> SolDos := y(t) = 4.002 e^{-0.500 t} cos(0.865 t)
```

$$SolDos := y(t) = 4.002 e^{-0.500 t} \cos(0.865 t) \quad (13)$$

```
> SolTres := y(t) = 7.8706 e^{-0.500 t} sin(0.865 t)
```

$$SolTres := y(t) = 7.8706 e^{-0.500 t} \sin(0.865 t) \quad (14)$$

```
> plot([rhs(SolUno), rhs(SolDos), rhs(SolTres)], t=0..3, color=[blue, orange, purple])
```



```
SolUno=azul,SolDos=naranja,SolTres:=verde
```

```
> plot(rhs(SolPartFinal), t=0..3)
```

