```
> restart
> F := 1/(s^2 + s + 1)
```

$$F := \frac{1}{s^2 + s + 1} \tag{1}$$

```
> with(inttrans) :
> f := simplify(invlaplace(F, s, t))
```

$$f := \frac{2\sqrt{3}\, e^{-\frac{t}{2}} \sin\left(\frac{\sqrt{3}\, t}{2}\right)}{3} \tag{2}$$

```
> G := (2·s^3 - 2·s^2 + 9 s - 8)/(s^2 + 4)^2
```

$$G := \frac{2 s^3 - 2 s^2 + 9 s - 8}{(s^2 + 4)^2} \tag{3}$$

```
> Solucion := y(t) = invlaplace(G, s, t)
```

$$Solucion := y(t) = 2\cos(2 t) + \frac{\sin(2 t)\,(-4 + t)}{4} \tag{4}$$

```
> Ecua := diff(y(t), t$2) + 4·y(t) = cos(2·t)
```

$$Ecua := \frac{d^2}{dt^2} y(t) + 4 y(t) = \cos(2 t) \tag{5}$$

```
> CondIni := y(0) = 2, D(y)(0) = -2
```

$$CondIni := y(0) = 2, D(y)(0) = -2 \tag{6}$$

```
> ComprobacionUno := simplify(eval(subs(y(t) = rhs(Solucion), lhs(Ecua) - rhs(Ecua) = 0)))
```

$$ComprobacionUno := 0 = 0 \tag{7}$$

```
> CondUno := simplify(subs(t = 0, Solucion))
```

$$CondUno := y(0) = 2 \tag{8}$$

```
> CondDos := D(y)(0) = simplify(subs(t = 0, rhs(diff(Solucion, t))))
```

$$CondDos := D(y)(0) = -2 \tag{9}$$

```
> EcuaTL := subs(CondIni, laplace(Ecua, t, s))
```

$$EcuaTL := s^2 \mathcal{L}(y(t), t, s) + 2 - 2 s + 4 \mathcal{L}(y(t), t, s) = \frac{s}{s^2 + 4} \tag{10}$$

```
> SolTL := simplify(isolate(EcuaTL, laplace(y(t), t, s)))
```

$$SolTL := \mathcal{L}(y(t), t, s) = \frac{2 s^3 - 2 s^2 + 9 s - 8}{(s^2 + 4)^2} \tag{11}$$

```
> SolPart := invlaplace(SolTL, s, t)
```

$$SolPart := y(t) = 2\cos(2 t) + \frac{\sin(2 t)\,(-4 + t)}{4} \tag{12}$$

```
> restart
> Ecua := y" - 6·y' + 8 y = 4·exp(2 x) - 8·exp(4·x)
```

$$Ecua := \frac{d^2}{dx^2} y(x) - 6 \frac{d}{dx} y(x) + 8 y(x) = 4 e^{2x} - 8 e^{4x} \quad (13)$$

> $CondIni := y(0) = -4, D(y)(0) = 5$

$$CondIni := y(0) = -4, D(y)(0) = 5 \quad (14)$$

> $with(inttrans)$:

> $EcuaTL := subs(CondIni, laplace(Ecua, x, s))$

$$EcuaTL := s^2 \mathcal{L}(y(x), x, s) - 29 + 4s - 6s \mathcal{L}(y(x), x, s) + 8 \mathcal{L}(y(x), x, s) = -\frac{4s}{(s-2)(s-4)} \quad (15)$$

> $SolTL := simplify(isolate(EcuaTL, laplace(y(x), x, s)))$

$$SolTL := \mathcal{L}(y(x), x, s) = \frac{-4s^3 + 53s^2 - 210s + 232}{(s-2)^2 (s-4)^2} \quad (16)$$

> $SolPart := expand(invlaplace(SolTL, s, x))$

$$SolPart := y(x) = -\frac{27 (e^x)^2}{2} - 2 (e^x)^2 x + \frac{19 (e^x)^4}{2} - 4 (e^x)^4 x \quad (17)$$

>