

```
> restart;
> with(PDEtools) :
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Solution to the coupled differential equations

This is the system of differential equations

```
> e0 := { \frac{\partial}{\partial t} \alpha(t) - \frac{w0}{2 \cdot I} \cdot \alpha(t) - \frac{wI}{2 \cdot I} \cdot \beta(t) \cdot e^{-I \cdot w0 \cdot t} = 0, \frac{\partial}{\partial t} \beta(t) + \frac{w0}{2 \cdot I} \cdot \beta(t) - \frac{wI}{2 \cdot I} \cdot \alpha(t) \cdot e^{I \cdot w0 \cdot t} = 0 } :
```

The Maple function pdsolve() places the solutions in a list.

```
> L := pdsolve(e0) :
```

```
> L[1] :
a := unapply(rhs(%), t) :
α := t → subs(ln(e) = 1, a(t)) :
'α(t)' = α(t);
e1 := α(0) = 1;
```

$$\alpha(t) = {}_C1 e^{-\frac{1}{2} I (w0 + \sqrt{wI^2}) t} + {}_C2 e^{-\frac{1}{2} I (w0 - \sqrt{wI^2}) t}$$

$$e1 := {}_C1 + {}_C2 = 1$$

(1)

```
> L[2] :
b := unapply(rhs(%), t) :
β := t → subs(ln(e) = 1, b(t)) :
'β(t)' = β(t);
e2 := β(0) = 0;
```

$$\beta(t) = \frac{e^{I w0 t} \left(-{}_C2 \sqrt{wI^2} e^{-\frac{1}{2} I (w0 - \sqrt{wI^2}) t} + e^{-\frac{1}{2} I (w0 + \sqrt{wI^2}) t} {}_C1 \sqrt{wI^2} \right)}{wI}$$

$$e2 := \frac{-{}_C2 \sqrt{wI^2} + {}_C1 \sqrt{wI^2}}{wI} = 0$$

(2)

```
> L2 := simplify((solve([e1, e2], [{}_C1, {}_C2]))):
L2[1][1];
L2[1][2];
```

$${}_C1 = \frac{1}{2}$$

$${}_C2 = \frac{1}{2}$$

(3)