

ED2

Feuille 2

Exercice 1

```
function('y',x)
f(x)=3
a=1; b=1; c=-2;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
```

$$_K2*e^{(-2*x)} + _K1*e^x - 3/2$$

```
var('x')
function('y',x)
f(x)=4*exp(-2*x)
a=4; b=-12; c=9;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
```

$$(_K2*x + _K1)*e^{(3/2*x)} + 4/49*e^{(-2*x)}$$

```
var('x')
function('y',x)
f(x)=2*x+1
a=1; b=-3; c=0;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
```

$$-1/3*x^2 + _K1*e^{(3*x)} + _K2 - 5/9*x - 5/27$$

```
var('x')
function('y',x)
f(x)=exp(x)*(3*x+2)
a=1; b=-2; c=5;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
```

$$(_K2*\cos(2*x) + _K1*\sin(2*x))*e^x + 1/4*(3*x + 2)*e^x$$

```
var('x')
function('y',x)
f(x)=x*exp(-2*x);
a=1; b=4; c=4;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
```

$$1/6*x^3*e^{(-2*x)} + (_K2*x + _K1)*e^{(-2*x)}$$

```
var('x')
function('y',x)
```

```
f(x)=cos(3*x)-2*sin(3*x)
a=2; b=2; c=1;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
```

$$(_K2*\cos(1/2*x) + _K1*\sin(1/2*x))*e^{(-1/2*x)} - 1/65*\cos(3*x) + 8/65*\sin(3*x)$$

Exercise 2

```
var('x')
function('y',x)
f(x)=x+4
a=1; b=2; c=1;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
h=desolve(eqd,y(x),[0,2,0]); print h
```

$$(_K2*x + _K1)*e^{(-x)} + x + 2$$

$$-x*e^{(-x)} + x + 2$$

```
var('x')
function('y',x)
f(x)=-2*x*x+9
a=1; b=3; c=2;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
h=desolve(eqd,y(x),[0,5,-3]); print h
```

$$-x^2 + _K1*e^{(-x)} + _K2*e^{(-2*x)} + 3*x + 1$$

$$-x^2 + 3*x + 2*e^{(-x)} + 2*e^{(-2*x)} + 1$$

```
var('x')
function('y',x)
f(x)=2*sin(3*x)
a=1; b=2; c=5;
eqd = a*diff(y(x),x,2) + b*diff(y(x),x)+c*y(x) - f(x)
g=desolve(eqd,y(x)); print g
h=desolve(eqd,y(x),[0,0,0]); print h
plot(h, (-5,5))
```

$$(_K2*\cos(2*x) + _K1*\sin(2*x))*e^{(-x)} - 3/13*\cos(3*x) - 2/13*\sin(3*x)$$

$$3/26*(2*\cos(2*x) + 3*\sin(2*x))*e^{(-x)} - 3/13*\cos(3*x) - 2/13*\sin(3*x)$$

