

ED1

Feuille 1

Exercice 1

```
function('y',x)
f(x)=x+1
u(x)=1
v(x)=3
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$_C * e^{-3*x} + 1/3*x + 2/9$$

```
function('y',x)
f(x)=(2*x+3)*exp(x)
u(x)=1
v(x)=-4
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$_C * e^{4*x} - 2/3*x * e^x - 11/9 * e^x$$

```
function('y',x)
f(x)=exp(x)
u(x)=1
v(x)=-4
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$_C * e^{4*x} - 1/3 * e^x$$

```
function('y',x)
f(x)=cos(4*x)
u(x)=1
v(x)=-5
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$_C * e^{5*x} - 5/41 * \cos(4*x) + 4/41 * \sin(4*x)$$

```
function('y',x)
u(x)=1
v(x)=-5
f(x)=cos(4*x)+sin(2*x)
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$_C * e^{5*x} - 5/41 * \cos(4*x) - 2/29 * \cos(2*x) + 4/41 * \sin(4*x) - 5/29 * \sin(2*x)$$

```
function('y',x)
u(x)=1
v(x)=-1
f(x)=exp(x)*(x^2+1)
```

```
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$\frac{1}{3}x^3e^x + _C e^x + x e^x$$

Exercise 2

```
function('y',x)
u(x)=1
v(x)=2/(x+1)
f(x)=exp(2*x)/(x+1)
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$\frac{1}{2}x e^{(2x)/(x+1)^2} + _C/(x+1)^2 + \frac{1}{4}e^{(2x)/(x+1)^2}$$

```
function('y',x)
u(x)=x
v(x)=x+1
f(x)=exp(-x)*cos(x)
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
```

$$_C e^{-x}/x + e^{-x} \sin(x)/x$$

Exercise 3

```
function('y',x)
u(x)=1+x
v(x)=1
f(x)=1/(1+x)
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
h=desolve(eqd,y(x),[0,2]); print expand(h)
```

$$\frac{_C}{(x+1)} + \frac{1}{2} \log(x^2 + 2x + 1)/(x+1)$$

$$\frac{1}{2} \log(x^2 + 2x + 1)/(x+1) + \frac{2}{(x+1)}$$

Exercise 4

```
function('y',x)
u(x)=1
v(x)=-1
f(x)=-4*exp(2*x)/(exp(x)+1)^2
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
h=desolve(eqd,y(x),[0,2]); print expand(h)
```

$$\frac{_C e^x + 4 e^x}{(e^x + 1)}$$

$$\frac{4 e^x}{(e^x + 1)}$$

```
function('y',x)
u(x)=1
v(x)=-1
f(x)=exp(x)-2*x
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
```

```
g=desolve(eqd,y(x)); print expand(g)
h=desolve(eqd,y(x),[0,3]); print expand(h)
```

$$\frac{C \cdot e^x + x \cdot e^x + 2x + 2}{x \cdot e^x + 2x + e^x + 2}$$

```
function('y',x)
u(x)=x
v(x)=-1
f(x)=log(x)
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
h=desolve(eqd,y(x),[1,1]); print expand(h)
```

$$\frac{C \cdot x - \log(x) - 1}{2 \cdot x - \log(x) - 1}$$

```
function('y',x)
u(x)=x
v(x)=1
f(x)=2*sin(x)
eqd = u(x)*diff(y(x),x) + v(x)*y(x) - f(x)
g=desolve(eqd,y(x)); print expand(g)
h=desolve(eqd,y(x),[pi,1]); print expand(h)
```

$$\frac{C/x - 2 \cdot \cos(x)/x}{\pi/x - 2 \cdot \cos(x)/x - 2/x}$$