Differentialligninger

2.2 At gøre prøve (side 34-35)

Eksempel 32 side 34 i grundbog A

```
> restart
> DiffLign := y' = x/y :
> dsolve(DiffLign)
```

$$y(x) = \sqrt{x^2 + _C1}\,,\ y(x) = -\sqrt{x^2 + _C1} \qquad (1.1)$$

Passer med bogens påstand, hvis man vælger 1. udtryk (+ foran kvadratroden), og vælger $_C1 = 3$

```
> y := x -> sqrt(x^2 + 3)
```

$$y := x \to \sqrt{x^2 + 3} \qquad (1.2)$$

```
> DiffLign
```

$$\frac{x}{\sqrt{x^2 + 3}} = \frac{x}{\sqrt{x^2 + 3}} \qquad (1.3)$$

Dvs. prøven stemmer!

Eksempel 33 side 34-35 i grundbog A

```
> restart
> DiffLign := y' = 2*x*exp(-y) :
> dsolve(DiffLign)
```

$$y(x) = \ln\left(x^2 + 2\,_C1\right) \qquad (2.1)$$

Passer med bogens påstand, hvis man vælger $_C1 = \frac{e}{2}$

```
> y := x -> ln(x^2 + exp(1))
```

$$y := x \to \ln\left(x^2 + e\right) \qquad (2.2)$$

```
> DiffLign
```

$$\frac{2x}{x^2 + e} = \frac{2x}{x^2 + e} \qquad (2.3)$$

Dvs. prøven stemmer!

Eksempel 34 side 35 i grundbog A

```
> restart
> DiffLign := y' = y*(20 - 5*y) :
> dsolve(DiffLign)
```

$$y(x) = \frac{4}{1 + 4\,e^{-20x}\,_C1} \qquad (3.1)$$

Passer med bogens påstand, hvis man vælger $_C1 = \frac{7}{4}$

> $y := x \to \frac{4}{1 + 7 \cdot e^{-20 \cdot x}}$

$$y := x \to \frac{4}{1 + 7\, e^{-20\, x}} \tag{3.2}$$

> *DiffLign*

$$\frac{560\, e^{-20\, x}}{\left(1 + 7\, e^{-20\, x}\right)^2} = \frac{4\left(20 - \frac{20}{1 + 7\, e^{-20\, x}}\right)}{1 + 7\, e^{-20\, x}} \tag{3.3}$$

> *simplify*(%)

$$\frac{560\, e^{-20\, x}}{\left(1 + 7\, e^{-20\, x}\right)^2} = \frac{560\, e^{-20\, x}}{\left(1 + 7\, e^{-20\, x}\right)^2} \tag{3.4}$$

Dvs. prøven stemmer!