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> with(LinearAlgebra):
```

Opgave 2

```
> ODE:=diff(u(t),t$2)-4*diff(u(t),t)+4*u(t)=4*exp(4*t);
```

$$ODE := \left(\frac{d^2}{dt^2} u(t) \right) - 4 \left(\frac{d}{dt} u(t) \right) + 4 u(t) = 4 e^{(4t)}$$

```
> dsolve({ODE, u(0)=1, D(u)(0)=4});
```

$$u(t) = e^{(4t)}$$

Opgave 3

```
> <<1|2-I|1+2*I|-1-I>, <1+I|1|3*I|2>, <I|2|-2+2*I|-1+I>>;
```

$$\begin{bmatrix} 1 & 2-I & 1+2I & -1-I \\ 1+I & 1 & 3I & 2 \\ I & 2 & -2+2I & -1+I \end{bmatrix}$$

```
> GaussianElimination(%);
```

$$\begin{bmatrix} 1 & 2-I & 1+2I & -1-I \\ 0 & -2-I & 1 & 2+2I \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Opgave 5

```
> A:=<<2| 2| 5| -3>, <-1| 5| 5| -3>, <-1| 2| 8| -3>, <-1| 2| 5| 0>>;
```

$$A := \begin{bmatrix} 2 & 2 & 5 & -3 \\ -1 & 5 & 5 & -3 \\ -1 & 2 & 8 & -3 \\ -1 & 2 & 5 & 0 \end{bmatrix}$$

```
> p:=CharacteristicPolynomial(A,lambda);
```

$$p := \lambda^4 - 15\lambda^3 + 81\lambda^2 - 189\lambda + 162$$

```
> factor(p); solve(p=0,lambda);
```

$$(\lambda - 6)(\lambda - 3)^3$$

6, 3, 3, 3

```
>
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