>

> # $\frac{\text{A) is basically gwn Jordan Form en kijken wat je eigenwaarden}}{\text{eigenvectoren zijn lolz.}}$

> restart : with(LinearAlgebra) :

> A := Matrix([[−2, 2, 2], [−5, 4, 3], [0, 0, 2]])

$$A := \begin{bmatrix} -2 & 2 & 2 \\ -5 & 4 & 3 \\ 0 & 0 & 2 \end{bmatrix} \tag{1}$$

> J, Q := JordanForm(A, output = ['J','Q'])

$$J, Q := \begin{bmatrix} 2 & 0 & 0 \\ 0 & 1-\mathrm{I} & 0 \\ 0 & 0 & 1+\mathrm{I} \end{bmatrix}, \begin{bmatrix} 1 & -\frac{1}{5}-\frac{2\,\mathrm{I}}{5} & -\frac{1}{5}+\frac{2\,\mathrm{I}}{5} \\ 1 & -\frac{1}{2}-\frac{\mathrm{I}}{2} & -\frac{1}{2}+\frac{\mathrm{I}}{2} \\ 1 & 0 & 0 \end{bmatrix} \tag{2}$$

> # Hierboven is a)

> # Ok nu b) Het idee is simpel, we willen $alpha_1$, α_2 en $y(t)$

y0 := Vector([1, 1, 1]) :

> constants := solve(Q . Vector([alpha1, alpha2, conjugate(alpha2)]) = y0,
[alpha1, alpha2]);

$$constants := [[\alpha 1 = 1, \alpha 2 = 0]] \tag{3}$$

> # nu nog y(t). y(t) = $Q \cdot exp(D) \cdot Q^{-1} \cdot y_0$

> D_exp := Matrix([[exp(2·t), 0, 0], [0, exp((1 − I)·t), 0], [0, 0, exp((1 + I)·t)]])

$$D\_exp := \begin{bmatrix} e^{2t} & 0 & 0 \\ 0 & e^{(1-\mathrm{I})t} & 0 \\ 0 & 0 & e^{(1+\mathrm{I})t} \end{bmatrix} \tag{4}$$

> y := Q · D_exp · MatrixInverse(Q) · y0

$$y := \begin{bmatrix} e^{2t} \\ e^{2t} \\ e^{2t} \end{bmatrix} \tag{5}$$

> # Et voila.

>