

1.10(b) · L6(b+6), 1.11(a, b), 1.13(c) - 1.8

i. 1) b)

$$\left(\begin{array}{ccc|c} 1 & 2 & -3 & -1 \\ 3 & -1 & 2 & 7 \\ 5 & 3 & -4 & 2 \end{array} \right)$$

$$\begin{aligned} R_2 & \\ 3 - x &= 0 \\ x &= 3 \end{aligned}$$

$$\begin{aligned} R_3 & \\ 5 - x &= 0 \\ x &= 5 \end{aligned}$$

$$R_2 \rightarrow R_2 - 3R_1 \quad R_3 \rightarrow R_3 - 5R_1$$

$$\left(\begin{array}{ccc|c} 1 & 2 & -3 & -1 \\ 0 & -7 & 11 & 10 \\ 0 & -7 & 11 & 7 \end{array} \right)$$

$$\begin{aligned} R_1 & \\ 2 - x - 7 &= 0 \\ x &= \frac{2}{-7} \end{aligned}$$

$$\begin{aligned} R_3 & \\ -7 - (x - 7) &\neq 0 \\ x &= -1 \end{aligned}$$

$$\left(\begin{array}{ccc|c} 1 & 0 & \frac{1}{7} & \frac{13}{7} \\ 0 & -7 & 11 & 10 \\ 0 & 0 & 0 & 0 \end{array} \right)$$

gauß opf

1.4 $\frac{(A x + B)(x - 1) + C x^2 + 4C}{x^3}$

$$c) \left(\begin{array}{ccc|c} a & a+1 & 0 & 0 \\ a & 0 & a+1 & 0 \\ 2a & 0 & 0 & a+1 \end{array} \right) \quad R_2 \rightarrow R_2 - R_1$$

$$\quad \quad \quad B_3 \rightarrow B_3 - 2R_1$$

$$\left(\begin{array}{ccc|c} a & a+1 & 0 & 0 \\ 0 & -(a+1) & a+1 & 0 \\ 0 & -2(a-1) & 0 & a+1 \end{array} \right) \quad R_1 \rightarrow R_1 + R_2$$

$$\quad \quad \quad R_3 \rightarrow R_3 - 2R_2$$

$$\quad \quad \quad 0 - 2(a+1)$$

$$\left(\begin{array}{ccc|c} a & 0 & a+1 & 0 \\ 0 & -(a+1) & a+1 & 0 \\ 0 & 0 & -2(a+1) & a+1 \end{array} \right) \quad R_1 \rightarrow R_1 + \frac{1}{2}R_3$$

$$\quad \quad \quad R_2 \rightarrow R_2 + \frac{1}{2}R_3$$

$$\left(\begin{array}{ccc|c} a & 0 & 0 & \frac{a+1}{2} \\ 0 & -(a+1) & 0 & \frac{a+1}{2} \\ 0 & 0 & -2(a+1) & a+1 \end{array} \right)$$

$$ax = \frac{a+1}{2} \Rightarrow x = \frac{a+1}{2a}$$

$$-(a+1)y = \frac{a+1}{2} \Rightarrow -y = \frac{1}{2} \Rightarrow y = -\frac{1}{2}$$

$$-2(a+1)z = a+1 \Rightarrow -2z = 1 \Rightarrow z = -\frac{1}{2}$$

Voor $a=0 \Rightarrow$ geen op!

Voor $a=-1 \Rightarrow$ oneindig veel op!

als

$a \neq 0$

$a \neq -1$

1.10) b)

$$\left(\begin{array}{ccc|c} 1 & 3 & -2 & 0 \\ 1 & -8 & 8 & 0 \\ 3 & -2 & 4 & 0 \end{array} \right)$$

$$R_2 \rightarrow R_2 - R_1$$

$$R_3 \rightarrow R_3 - 3R_1$$

$$\left(\begin{array}{ccc|c} 1 & 3 & -2 & 0 \\ 0 & -11 & 10 & 0 \\ 0 & -11 & 10 & 0 \end{array} \right)$$

$$R_1 \rightarrow R_1 - \frac{3}{11}R_2 \quad R_3 \rightarrow R_3 - R_2$$

$$3 + x \cdot 11 = 0 \\ x = -\frac{3}{11}$$

$$\left(\begin{array}{ccc|c} 1 & 0 & \frac{8}{11} & 0 \\ 0 & -11 & 10 & 0 \\ 0 & 0 & 0 & 0 \end{array} \right)$$

$$x + \frac{8}{11}\lambda = 0$$

$$x = -\frac{8}{11}\lambda$$

$$x_3 = \lambda$$

$$-11y + 10\lambda = 0$$

$$y = -\frac{10\lambda}{11}$$

$$z = \lambda$$

1.11) b) rang 2

1.11) a) rang 3

$$1.6) b) \left(\begin{array}{cc|c} 1 & a & a+1 \\ a & 1 & 2 \end{array} \right) \quad R_2 \rightarrow R_2 - aR_1$$

$$\left(\begin{array}{cc|c} 1 & a & a+1 \\ 0 & 1-a^2 & -a^2+a+2 \end{array} \right) \quad 2 - a(a+1)$$

$$\text{geval 1} \quad 1 - a^2 = (-a)(1+a) \quad 2 - a^2 + a$$

$$a=1$$

$$\left(\begin{array}{cc|c} 1 & 1 & 2 \\ 0 & 0 & 2 \end{array} \right) \Rightarrow \text{onbeïndig veel op!}$$

$$y = \lambda$$

$$x + \lambda = 2$$

$$x = 2 - \lambda$$

$$\text{geval 2} \quad a = -1$$

$$\left(\begin{array}{cc|c} 1 & -1 & 0 \\ 0 & 0 & 0 \end{array} \right) \rightarrow \text{strijdig stelsel}$$

$$\text{geval 3} \quad a \neq 1 \text{ en } a \neq -1$$

$$\left(\begin{array}{cc|c} 1 & a & a+1 \\ 0 & (1-a)(1+a) & (1-a)(a+2) \end{array} \right) \quad \frac{(a+1)(a+1)}{a^2+2a+1 - a^2 - 2a}$$

$$(1+a)y = a+2$$

$$y = \frac{a+2}{a+1}$$

$$x + a\left(\frac{a+2}{a+1}\right) = a+1$$

$$x = \frac{(a+1)^2}{a+1} - \frac{a^2 - 2a}{a+1}$$

$$x = \frac{1}{a+1}$$

1. # 13) c)

$$\begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix} \lambda_1 + \begin{pmatrix} -1 \\ 5 \\ 3 \end{pmatrix} \lambda_2 + \begin{pmatrix} 1 \\ 0 \\ 2 \end{pmatrix} \lambda_3 + \begin{pmatrix} 2 \\ -15 \\ 1 \end{pmatrix} \lambda_4 = 0$$

$$\left(\begin{array}{cccc|c} 1 & -1 & 1 & 2 & 0 \\ -2 & 5 & 0 & -15 & 0 \\ 3 & 3 & 2 & 1 & 0 \end{array} \right) \quad \begin{array}{l} R_2 \rightarrow R_2 + 2R_1 \\ R_3 \rightarrow R_3 - 3R_1 \end{array}$$

$$\left(\begin{array}{cccc|c} 1 & -1 & 1 & 2 & 0 \\ 0 & 3 & 2 & -11 & 0 \\ 0 & 6 & -1 & -5 & 0 \end{array} \right) \quad \begin{array}{l} R_1 \rightarrow R_1 + \frac{1}{3}R_2 \\ R_3 \rightarrow R_3 - 2R_2 \end{array}$$

$$\left(\begin{array}{cccc|c} 1 & 0 & \frac{5}{3} & -\frac{5}{3} & 0 \\ 0 & 3 & 2 & -11 & 0 \\ 0 & 0 & -5 & 17 & 0 \end{array} \right) \quad \begin{array}{l} R_1 \rightarrow R_1 + \frac{1}{3}R_3 \\ R_2 \rightarrow R_2 + \frac{2}{5}R_3 \end{array}$$

$$\left(\begin{array}{cccc|c} 1 & 0 & 0 & 4 & 0 \\ 0 & 3 & 0 & -\frac{21}{5} & 0 \\ 0 & 0 & -5 & 17 & 0 \end{array} \right)$$

$$\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \lambda_1 + \begin{pmatrix} 0 \\ 3 \\ 0 \end{pmatrix} \lambda_2 + \begin{pmatrix} 0 \\ 0 \\ -5 \end{pmatrix} \lambda_3 = \begin{pmatrix} 4 \\ -\frac{21}{5} \\ 17 \end{pmatrix} \lambda_4$$

$$\lambda_1 = 4 \quad \lambda_2 = -\frac{7}{5} \quad \lambda_3 = -\frac{17}{5} \quad \lambda_4 = 1$$

lineair afhankelijk

$$1.8) \left(\begin{array}{ccc|c} k & 5 & 3 & 0 \\ 5 & 1 & -1 & 0 \\ k & 2 & 1 & 0 \end{array} \right) \quad R_2 \rightarrow kR_2$$

$k \neq 0$

$$\left(\begin{array}{ccc|c} k & 5 & 3 & 0 \\ 5k & k & -k & 0 \\ k & 2 & 1 & 0 \end{array} \right) \quad k=1$$

$$\left(\begin{array}{ccc|c} 1 & 5 & 3 & 0 \\ 5 & 1 & -1 & 6 \\ 1 & 2 & -1 & 0 \end{array} \right) \quad R_2 = R_2 - 5R_1$$

$$R_3 \rightarrow R_3 - \frac{3}{5}R_2 \quad \left(\begin{array}{ccc|c} 1 & 5 & 3 & 0 \\ 0 & -4 & -16 & 6 \\ 0 & -3 & -2 & 0 \end{array} \right) \quad R_3 = R_3 - R_1$$

$$\left(\begin{array}{ccc|c} 1 & 0 & -17 & 0 \\ 0 & -4 & -16 & 0 \\ 0 & 0 & 10 & 0 \end{array} \right)$$

$$x = \lambda$$

1.12)
$$\left(\begin{array}{cccc|c} 1 & 5 & 2 & 3 & 0 \\ 4 & 2 & -1 & -6 & 0 \\ -5 & 1 & 3 & 11 & 0 \end{array} \right)$$

$$R_2 \rightarrow R_2 - 4R_1$$

$$R_3 \rightarrow R_3 + 5R_1$$

$$\left(\begin{array}{cccc|c} 1 & 5 & 2 & 3 & 0 \\ 0 & -18 & -9 & -14 & 0 \\ 0 & 26 & 13 & 26 & 0 \end{array} \right)$$

$$R_1 \rightarrow R_1 + \frac{5}{18} R_2$$

$$R_3 \rightarrow R_3 -$$

⋮
⋮
⋮
⋮

b) we kiezen 2 vectoren die onafhankelijk en dan maken we half gelijk aan de andere 2. bvb $\lambda_1 a + \lambda_2 b = c$, $\lambda_1 a + \lambda_2 b = d$, ...

(2.1) (1) $A\vec{a} = \begin{pmatrix} 9 \\ -5 \end{pmatrix} \Rightarrow Q(A\vec{a}) = \begin{pmatrix} 27 \\ -5 \end{pmatrix}$

m) $QA = \begin{pmatrix} 3 & -6 & 9 \\ 0 & 3 & 4 \end{pmatrix} \Rightarrow (QA)\vec{a} = \begin{pmatrix} 27 \\ -5 \end{pmatrix}$

(2.4) $\begin{pmatrix} a & b \\ c & d \end{pmatrix} \times \begin{pmatrix} 3 & 1 \\ 3 & 2 \end{pmatrix} = \begin{pmatrix} 3 & 2 \\ 1 & 4 \end{pmatrix}$

$$2a + 3b = 3 \quad \left(\begin{array}{cc|c} 2 & 3 & 3 \\ 1 & 2 & 2 \end{array} \right) \begin{matrix} R_1 \rightarrow R_1/2 \\ R_2 \rightarrow R_2 - R_1 \end{matrix} \quad \text{zelfde voor c en d}$$

$$2c + 3d = 1 \quad \left(\begin{array}{cc|c} 1 & \frac{3}{2} & \frac{3}{2} \\ 0 & \frac{1}{2} & \frac{1}{2} \end{array} \right) \begin{matrix} R_1 \rightarrow R_1 - 3R_2 \\ C = -10 \quad d = 7 \end{matrix}$$

$$a + 2b = 2 \quad \left(\begin{array}{cc|c} 1 & 0 & 0 \\ 0 & \frac{1}{2} & \frac{1}{2} \end{array} \right) \quad B = \begin{pmatrix} 0 & 1 \\ -10 & 7 \end{pmatrix}$$

$$a = 6$$

$$b = 1$$

$$2.7) b) \begin{pmatrix} 1 & 2 \\ 2 & 0 \end{pmatrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 2 & 0 \end{pmatrix}$$

11 $a + 2c = a + 2b = 0$
 $\hookrightarrow a = a, 2c = 2b$

21 $2a = c + 2d$

$$\begin{pmatrix} a & 2a-2d \\ 2a-2d & d \end{pmatrix}$$

12 $b + 2d = 2a$

22 $2b = 2c = 0$
 $\hookrightarrow b = c$

$b = c = 2a - 2d$

2.8) a) nein

c) ja

2.14)