Correction exercice 50 p. 283

$$(2+i)z + 4 - i = 0$$
$$(2+i)z = -4+i$$
$$z = \frac{-4+i}{2+i}$$
$$z = \frac{(-4+i)(2-i)}{5} = \frac{-8+4i+2i-i^2}{5}$$
$$\boxed{z = \frac{-7+6i}{5} = -\frac{7}{5} + \frac{6}{5}i}$$

- vérification "manuelle" en remplaçant z dans l'équation

ou

- utilisation du classpad pour vérifier

solve $((2+i)z + 4 - i = 0, z)$

Correction exercice 51 p. 283.

$$\frac{1}{2z-i} = -1+2i$$
$$(2z-i)(-1+2i) = 1$$
$$2z(-1+2i) + i - 2i^2 = 1$$
$$2z(-1+2i) = 1 - i - 2$$
$$2z(-1+2i) = -1-i$$
$$z = \frac{-1-i}{2(-1+2i)}$$
$$z = \frac{(-1-i)(-1-2i)}{2 \times 5}$$
$$z = \frac{1}{10}(1+2i+i+2i^2) = \frac{1}{10}(-1+3i)$$
$$\boxed{z = \frac{-1}{10} + \frac{3}{10}i}$$

Correction exercice 53 p.283

$$\begin{cases} 2z_1 - z_2 = 5 & (1) \\ i z_1 + 3 z_2 = 7i & (2) \end{cases}$$

$i \times (1)$ et $-2 \times (2)$:

$$\begin{cases} 2i z_1 - i z_2 = 5i \\ -2i z_1 - 6 z_2 = -14i \end{cases}$$

$$(-6-i) z_2 = -9i$$

$$z_2 = \frac{-9i}{-6-i}$$

$$z_2 = \frac{-9i(-6+i)}{37}$$

$$z_2 = \frac{+54i + 9}{37}$$

$$z_2 = \frac{9}{37} + \frac{54}{37} i$$

$3 \times (1)$ et (2) :

$$\begin{cases} 6z_1 - 3z_2 = 15 \\ i z_1 + 3 z_2 = 7i \end{cases}$$

$$(6+i) z_1 = 15 + 7i$$

$$z_1 = \frac{15+7i}{6+i}$$

$$z_1 = \frac{(15+7i)(6-i)}{37}$$

$$z_1 = \frac{90 - 15i + 42i - 7i^2}{37}$$

$$z_1 = \frac{97}{37} - \frac{27}{37} i$$

Le couple $(z_1 ; z_2)$ solution du système est :

$$\left(\frac{97}{37} - \frac{27}{37} i \; ; \; \frac{9}{37} + \frac{54}{37} i \right)$$

Vérification en utilisant le classpad

solve ({ $2x - y = 5$, $ix + 3y = 7i$ } , { x, y })

b) $\begin{cases} z_1 - i z_2 = 0 & (1) \\ 2z_1 + z_2 = i & (2) \end{cases}$

$\begin{cases} z_1 - i z_2 = 0 & (1) \\ 2i z_1 + i z_2 = -1 & i \times (2) \end{cases}$

$(1+2i) z_1 = -1$

$z_1 = -\frac{1}{1+2i}$

$z_1 = \frac{-1(1-2i)}{5}$

$z_1 = \frac{-1+2i}{5}$

$z_1 = -\frac{1}{5} + \frac{2}{5} i$

$\begin{cases} -2z_1 + 2i z_2 = 0 & -2 \times (1) \\ 2z_1 + z_2 = i & (2) \end{cases}$

$(2i+1) z_2 = i$

$z_2 = \frac{i}{2i+1} = \frac{i}{1+2i}$

$z_2 = \frac{i(1-2i)}{5}$

$z_2 = \frac{i+2}{5}$

$z_2 = \frac{2}{5} + \frac{1}{5} i$

verification "manuelle"

$-\frac{1}{5} + \frac{2}{5} i - i\left(\frac{2}{5} + \frac{1}{5} i\right) = -\frac{1}{5} + \frac{2}{5} i - \frac{2}{5} i + \frac{1}{5} = 0$

$2\left(-\frac{1}{5} + \frac{2}{5} i\right) + \frac{2}{5} + \frac{1}{5} i = -\frac{2}{5} + \frac{4}{5} i + \frac{2}{5} + \frac{1}{5} i = \frac{5}{5} i = i$

Le couple solution $(z_1 ; z_2)$ du système est $\left(-\frac{1}{5} + \frac{2}{5} i \; ; \; \frac{2}{5} + \frac{1}{5} i\right)$