

HY-215

Φροντιστήριο 1 - Μπαδουκί

Άσκηση 1 (HWL-2018-19 Άσκηση 1a)

$$\frac{2-jz}{j+z} = 1 \Rightarrow \frac{2-j(x+jy)}{j+x+jy} = 1 \Rightarrow$$

$$2-j(x+jy) = j+x+jy \Rightarrow$$

$$2-jx - \overset{1.2}{j}y = x + j(1+y) \Rightarrow$$

$$\underline{2-jx+y} = x + \underline{j(1+y)} \Rightarrow$$

$$\begin{cases} 2+y = x \\ -x = 1+y \end{cases} \Rightarrow \begin{cases} 2+y = -1-y \\ x = -1-y \end{cases} \Rightarrow \begin{cases} 2y = -3 \\ x = -1-y \end{cases}$$

$$\Rightarrow \begin{cases} y = \underline{\underline{-\frac{3}{2}}} \\ x = \underline{\underline{-1 + \frac{3}{2}}} = \underline{\underline{\frac{1}{2}}} \end{cases}$$

Aufgaben 2 (HW 1-2018-19 Aufgaben 2a)

$$(1+j)(z+z^*) + (2-j)(z+2z^*) = 1 \Rightarrow$$

$$(1+j) 2\operatorname{Re}\{z\} + (2-j)(\underbrace{z+z^*}_{2\operatorname{Re}\{z\}} + \underbrace{z^*}_{(x-iy)}) = 1 \Rightarrow$$

$$(1+j) 2x + (2-j)(2x + x - yj) = 1 \Rightarrow$$

$$(1+j)2x + (2-j)(3x - yj) = 1 \Rightarrow$$

$$2x + 2xj + 6x - 2yj - 3xj + yj^2 = 1 \Rightarrow$$

$$2x + 2xj + 6x - 2yj - 3xj - y = 1 \Rightarrow$$

$$8x - y - xj - 2yj = 1 + 0j \Rightarrow$$

$$\begin{cases} 8x - y = 1 \\ -x - 2y = 0 \end{cases} \Rightarrow \begin{cases} -16y - y = 1 \\ x = -2y \end{cases} \Rightarrow \begin{cases} y = \frac{-1}{17} \\ x = \frac{2}{17} \end{cases}$$

Aufgaben 3 (HW1-2018-19 - Aufgaben 6a)

$$z^4 = 2 + 2\sqrt{3}j \Rightarrow$$

$$z^4 = \sqrt{4+3} \cdot e^{j \tan^{-1} \frac{2\sqrt{3}}{2}} \Rightarrow$$

$$|z|^4 e^{j4\theta} = \sqrt{7} e^{j \tan^{-1} \sqrt{3}} \Rightarrow$$

$$\begin{cases} |z| = \sqrt[4]{7} \\ 4\theta = \tan^{-1} \sqrt{3} + 2k\pi \end{cases} \Rightarrow$$

$$\begin{cases} |z| = \sqrt[4]{7} \\ \theta = \frac{1}{4} \left( \frac{\pi}{3} + 2k\pi \right), k=0,1,2,3 \end{cases}$$

Aufgaben 4 (HW1-2018-19 - Aufgaben 6b)

$$z^3 + 4\sqrt{2} + j4\sqrt{2} = 0 \Rightarrow$$

$$z^3 = \underline{-4\sqrt{2} - j4\sqrt{2}} \Rightarrow$$

$$z^3 = |-4\sqrt{2} - 4\sqrt{2}j| \cdot e^{j \frac{-3\pi}{4}} \Rightarrow$$

$$|z|^3 \cdot e^{j3\theta} = 8 \cdot e^{j \frac{-3\pi}{4}} \Rightarrow$$

$$\begin{cases} |z|^3 = 8 \\ 3\theta = \frac{-3\pi}{4} + 2k\pi \end{cases} \Rightarrow$$

$$\begin{cases} |z| = 2 \\ \theta = \frac{1}{3} \left( 2k\pi - \frac{3\pi}{4} \right), k=0,1,2 \end{cases}$$

Accoun 4 (HW1-2018-19 Accoun 7a)

Accoun 5 (HW1-2018-19 Accoun 7b)