

Numere complexe

1 Conjugat

1.1 Definitie

$$z = a + bi, \quad a, b \in \mathbb{R}$$

$$\bar{z} = a - bi$$

1.2 Proprietati

$$1. \quad \overline{z_1 + z_2} = \bar{z}_1 + \bar{z}_2$$

$$2. \quad \overline{z_1 \cdot z_2} = \bar{z}_1 \cdot \bar{z}_2$$

$$3. \quad \overline{z^n} = \bar{z}^n$$

$$4. \quad \overline{\left(\frac{z_1}{z_2}\right)} = \frac{\bar{z}_1}{\bar{z}_2}$$

$$5. \quad z \in \mathbb{R} \Leftrightarrow \bar{z} = z$$

$$6. \quad z \in i\mathbb{R} \Leftrightarrow \bar{z} = -z$$

2 Modul

2.1 Definitie

$$z = a + bi, \quad a, b \in \mathbb{R}$$

$$|z| = \sqrt{a^2 + b^2}$$

2.2 Proprietati

$$1. \quad |z| = 0 \Leftrightarrow z = 0$$

$$2. \quad |z| = |\bar{z}|$$

$$3. \quad z \cdot \bar{z} = |z|^2$$

$$4. \quad |z_1 \cdot z_2| = |z_1| \cdot |z_2|$$

$$5. \quad \left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|}$$

$$6. \quad |z_1 + z_2| \leq |z_1| + |z_2|$$