Cheat Sheet: Comp Sc BSc, LinAlg - Brian Funk, 21.04.2001 - **22-918-18-957**

Complex Numbers

Basics

Def : $z = a + bi \Leftrightarrow \Re(z) = a, Im(z) = b$
Def : $z = a + bi \Leftrightarrow \bar{z} = a - bi \Leftrightarrow r \cdot e^{2\pi - \phi}$
Def : $z = r \cdot cos(\phi) + i \cdot sin(\phi)$
Def : $|z| = r = \sqrt{x^2 + y^2} = \sqrt{z \cdot \bar{z}}$
Def : $\phi = \begin{cases} arctan\frac{y}{x} & \textbf{1. Q} \\ arctan\frac{y}{x} + \pi & \textbf{2./3. Q} \\ arctan\frac{y}{x} + 2pi & \textbf{4. Q} \end{cases}$

Operations

Def : $z_1 \pm z_2 : (x_1 + x_2) \pm i(y_1 + y_2)$
Def :
$z_1 \cdot z_2 : (x_1 + i \cdot y_1) + (x_2 + i \cdot y_2) = r_1 \cdot r_2 e^{i(\phi_1 + \phi_2)}$
Def : $\frac{z_1}{z_2} : \frac{r_1}{r_2} e^{i(\phi_1 - \phi_2)} = \frac{z_1 \cdot \bar{z_2}}{|z_2|^2}$
Def : $\sqrt[n]{a} \Leftrightarrow a = z^n \Leftrightarrow |a| \cdot e^{i\phi} = r^n \cdot e^{i\omega n} \Leftrightarrow r = \sqrt[n]{|a|}, \omega = \frac{\phi + 2k\pi}{n}$

Polynomials

The roots of a complex polynomial are pairwise conjugated. **Def :** $z = \frac{b \pm \sqrt{b^2 - 4ac}}{2a}$
Def : $az^n + c = 0 \Leftrightarrow z = \sqrt[n]{-\frac{c}{a}}$
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SLE

Basics

Matrices and Vectors

Basics

LU-Decomposition

Basics

Vectorspaces

Basics

Linear Maps

Basics

Vector spaces with scalar products

Basics

Least Squares

Basics

QR-Decomposition

Basics

Eigenvalues and -vectors

Basics

Singular Value Decomposition

Basics