Quantum Computing and Cryptography - 03: Complex Numbers on a Plane

Length	Nanomodule
Collection	NSA NCCP
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Academic Levels	Undergraduate, Graduate
Topics	Cryptography, Quantum Computing
Link	https://clark.center/details/aparakh/27aed563-88eb-46e3-8641-56a44422eaba

Description

This is the third and final lesson that reviews the complex numbers background needed for quantum computing and cryptography. In this lesson, students will learn cartesian and polar representations of complex numbers, conversion between the two representations and plotting them on a complex plane. Students will also write programs to implement these operations.

Email Dr. Abhishek Parakh at aparakh@unomaha.edu for solutions to the problems.

Note: To get started with Jupyter notebooks please follow the userguide available at: https://sites.google.com/unomaha.edu/userguideqcl/

Notes

For solutions please contact Dr. Abhishek Parakh at aparakh@unomaha.edu.

Outcomes

- Change back and forth between Cartesian and polar representations.
- Demonstrate complex numbers using polar representations and plot them on the complex plane.
- Demonstrate complex numbers as Cartesian coordinates and plot them on the complex plane.
- Implement programs that convert between Cartesian and polar representations.

Alignment

The standards and guidelines this learning object is mapped to

- CAE Cyber Ops (2014) - Discrete Math: Given an algorithm determine the complexity of the algorithm and cases in which the algorithm would/would not provide a reasonable approach for solving a problem
- NICE Workforce Knowledge (2017) - K0052: Knowledge of mathematics (e.g. logarithms, trigonometry, linear algebra, calculus, statistics, and operational analysis).

Links

External links that are associated with this learning object

- User guide