Introduction to Quantum Programming and Semantics

Lecture 10: Complementarity

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Overview

- Complementary bases
- Complementary classical structures
- Equivalence
- Bialgebras

Complementary bases

Complementary bases: definition

Complementary bases: examples

Complementary classical structures

Complementary classical structures: definition

Complementary classical structures: examples

Characterisation with unitaries

Equivalence

Complementarity: bases vs classical structures

Bialgebras

Bialgebras and Hopf algebras

Qubit gates

Summary:

- Different bases in Hilbert spaces can be complementary
- Equivalent definition through bases or diagrams
- Complementarity is necessary to represent quantum operations