Composing Quantum Operations

Remark

Claim: What is computation and what are the following types of computation

1. Deterministic computation
2. Non-determistic computation

Proof:

Computation is a physical process that evolves a prescribed initial configuration called input into some final configuration called output.

1. The initial configuration evolves through a single sequence of states to reach the final output configuration.
2. The initial configuration can evolve through more then one path to reach the final output configuration.

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Claim: Given an initial state and final state how is probability computed?

Proof:

The probability amplitude of a particular final state being reached is the sum amplitudes of all mutually exclusive paths which connect initial state and final state.

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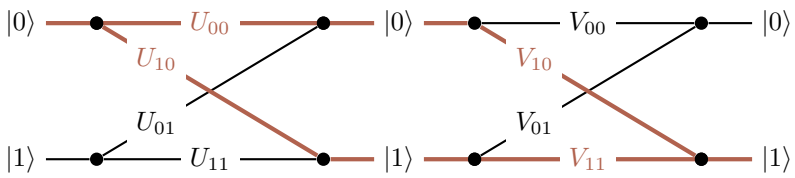
Claim:

1. The transition amplitudes associated with a single time step in a computational process can be represented as a matrix.
2. The total probability amplitude associated with an initial input evolving into a particular output can be computed via matrix multiplication



Proof:

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