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Theoretical Analysis on the Measurement Feedback Coherent Ising Machine

The Coherent Ising Machine (CIM) is a degenerate optical parametric oscillator network to solve Ising-type combinatorial optimization problems. The CIM with measurement feedback system has been recently demonstrated at Stanford University and NTT independently. In these machines, the oscillators are coupled with the quantum measurement and feedback process. We formulated a quantum model with CPTP maps of the components, and numerically evaluated how much the quantum coherence of the “up spin” and the “down spin” exists during the optimization process.