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Training Optimization for Gate-Model Quantum Neural Networks¹ LASZLO GYONGYOSI, University of Southampton, Budapest Univ. of Tech, SANDOR IMRE, Budapest Univ. of Tech — Gate-based quantum computations represent an essential to realize near-term quantum computer architectures. A gate-model quantum neural network (QNN) is a QNN implemented on a gate-model quantum computer, realized via a set of unitaries with associated gate parameters. Here, we define a training optimization procedure for gate-model QNNs. By deriving the environmental attributes of the gate-model quantum network, we prove the constraint-based learning models. We show that the optimal learning procedures are different if side information is available in different directions, and if side information is accessible about the previous running sequences of the gate-model QNN. The results are particularly convenient for gate-model quantum computer implementations.

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