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Towards a Learning Based Error Mitigation Method for Simulating Quantum Fields

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Noise poses a practical challenge to quantum computation on NISQ devices. Earlier attempts to simulate quantum fields on a quantum computer have all utilized error mitigation to extract meaningful results as it would not be possible otherwise. Usually, the mitigation technique is Zero Noise Extrapolation (ZNE) but recent results have proved a large difference in error reduction between ZNE and Learning based error mitigation techniques. Here, we investigate whether these recent developments can improve the simulation of the dynamics of Quantum Fields on Quantum Computers. In particular, we explore variable noise Clifford Data Regression vncDR using the error mitigation technique. We report that indeed, learning based error mitigation improves the simulation of Quantum Fields on Quantum Computers.

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