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Scaling of Normalizing Flows for Lattice Gauge Theories: Automated Hyperparameter Optimization and Transfer Learning

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In this study, we present an analysis of the weak and strong scaling behaviours of normalizing flow methods applied to $SU(2)$ and $SU(3)$ gauge theories. We investigate the performance of these normalizing flows across varying lattice volumes and spacings, providing insights into their scalability and computational demands. Additionally, we perform an automated hyper-parameter optimization process, which facilitates efficient transfer learning of models with different lattice parameters. Our results demonstrate the potential of automated hyper-parameter optimization to enhance the robustness and adaptability of Flow-based methods

Primary author: KIRWAN, Christopher (Trinity College Dublin)

Co-authors: Mr JOHNSTON, Michael (IBM Research Europe. Dublin); RYAN, Sinead (Trinity College Dublin); Mr VENUGOPAL, Srikumar (IBM Research Europe. Dublin); Mr VASSILIADIS, Vassilis (IBM Research Europe. Dublin)

Presenter: KIRWAN, Christopher (Trinity College Dublin)

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