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Classically perfect gradient flows

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Classically perfect fixed-point lattice actions preserve continuum classical properties while reducing lattice artifacts at the quantum level. They allow the extraction of continuum physics from coarser lattices and hence provide an effective way to overcome the challenges of critical slowing down and topological freezing as the continuum limit is approached. In this talk we show that fixed-point actions can be used to define classically perfect gradient-flow observables which are free of tree-level lattice artifacts to all orders. We demonstrate the effectiveness of this approach using a fixed-point action for four-dimensional SU(3) gauge theory obtained from a machine-learned gauge-covariant convolutional neural network.

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