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The gradient flow in simple field theories

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The gradient flow has proved a valuable tool to the lattice community, with a range of applications to a variety of lattice calculations, from scale-setting to renormalisation. In this talk, I will focus on the gradient flow as a tool to suppress power-divergent mixing, a consequence of the hypercubic symmetry of the lattice regulator that is a particular difficulty for calculations of high moments of parton distribution functions. Provided the flow time is kept fixed in physical units, the gradient flow removes power-divergent mixing at the expense of introducing a new physical scale in the continuum. The smeared operator product expansion is a formalism that systematically accounts for this additional scale and connects nonperturbative calculations of flowed operators to continuum physics. Here I investigate the role of the gradient flow in suppressing power-divergent mixing and discuss the smeared operator product expansion for simple field theories.

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