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# Studying critical slowing down of topological observables

In this work, we focus on the development of algorithms to update the field configurations for lattice gauge theories. In particular, we have been interested in testing these methods using the $CP^{N-1}$ model, which reproduces the same physical properties contained in QCD, such as asymptotic freedom, confinement and mass gap. This model has the advantage of being simpler to simulate (requires less computational cost), and therefore is a good laboratory for testing new methods.

We are going to discuss the main features of the simulations of the $CP^{N-1}$ model, starting from the standard Monte Carlo techniques and going to the new possible perspectives. It can also be interesting to discuss whether these new ideas can be implemented in an efficient way to other cases of physical interest, such as gauge fixing.

## Special requests

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