Enno Carstensen: Machine Learning Kernels in Real-Time Complex Langevin

Real time evolution in QFT poses a severe sign problem, which may be alleviated via a complex Langevin approach. However, so far simulation results consistently fail to converge with a large real-time extent. A kernel in a complex Langevin equation is known to influence the appearance of the boundary terms, and thus kernel choice can improve the range of real-time extents with correct results. For multi-dimensional models the optimal kernel is searched for using machine learning methods. We test this approach by simulating the simplest possible case, a 0+1-dimensional scalar field theory, to which analytic solutions are known, and apply machine-learning approaches to different kernel ansatzes.