



Contribution ID: 424

Type: **Talk**

An algorithm for thimble regularization of lattice field theories (and possibly not only for that)

Friday, 27 June 2014 14:15 (20 minutes)

In the context of thimble regularization of lattice field theories we are developing a new simulation algorithm. The main difficulty is to devise a sampling of configurations on a non-trivial manifold, which is defined as the hypersurface formed by the union of all paths of steepest descent of the complex action ending in a given saddle point. The main point with the new algorithm is the one-to-one correspondence of configurations and action values on a given steepest descent curve, which can in turn be seen as a steepest ascent if one changes the sign of the “time” variable.

We discuss the possible extensions of the algorithm to more general field theories. In the context of Lattice QCD the possible main advantage could be a mitigation of the problems connected to different topological sectors.

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Session Classification: Algorithms and Machines

Track Classification: Algorithms and Machines