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Thimble regularisation of YM fields: crunching a hard problem.

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Thimble regularisation of Yang Mills theories is still to a very large extent terra incognita. We will discuss a couple of topics related to this big issue. 2d YM theories are in principle good candidates as a working ground. An analytic solution is known, for which one can switch from a solution in terms of a sum over characters to a form which is a sum over critical points. We would be interested in an explicit realisation of this mechanism in the lattice regularisation, which is actually quite hard to work out. A second topic is the inclusion of a topological term in the lattice theory, which is the prototype of a genuine sign problem for pure YM fields. For both these challenging problems we do not have final answers. We will present the current status of our study.

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