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Topologically restricted measurements in lattice sigma-models

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We consider models with topological sectors and difficulties with their Monte Carlo simulation. In particular, we are concerned with the situation where a simulation has a very long auto-correlation time with respect to the topological charge. In such cases, reliable numerical measurements are only possible within single topological sectors. The challenge is to assemble such restricted measurements to obtain an approximation for the complete result, which corresponds to the correct sampling over the entire set of configurations. We show that under certain conditions this is indeed possible and additionally provides an estimate for the topological susceptibility chi_t. Based on the correlation of the topological charge density, the evaluation of chi_t might be feasible even from data in just one topological sector. Here we present numerical results for these techniques in the framework of non-linear sigma-models by using a cluster algorithm.

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