

Day 4

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Title: Variational Quantum Annealing Simulations of Non-stoquastic Hamiltonians

Abstract:

It was recently shown that the quantum annealing paradigm could be emulated in a variational Monte Carlo (VMC) framework using autoregressive neural networks [1]. However, in that work, only stoquastic driver Hamiltonians were considered. Here, we leverage the fact that the VMC algorithm is inherently sign-problem-free to simulate quantum annealing with non-stoquastic drivers. We show that the variational quantum annealing method is able to capture the dynamics of a variety of non-stoquastic Hamiltonians and can provide an advantage for annealing paths that are hampered by exponentially closing gaps [2].

[1] M. Hibat-Allah, E. M. Inack, R. Wiersema, R. G. Melko, J. Carrasquilla, arXiv:2101.10154

[2] Nishimori and Takada, Frontiers in ICT 4, 2 (2017)