Improved mapping of the travelling salesman problem for quantum annealing MATTHIAS TROYER, BETTINA HEIM, ETHAN BROWN, ETH Zurich, DAVID WECKER, Quantum Architectures and Computation Group, Microsoft Research — We consider the quantum adiabatic algorithm as applied to the travelling salesman problem (TSP). We introduce a novel mapping of TSP to an Ising spin glass Hamiltonian and compare it to previous known mappings. Through direct perturbative analysis, unitary evolution, and simulated quantum annealing, we show this new mapping to be significantly superior. We discuss how this advantage can translate to actual physical implementations of TSP on quantum annealers.

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