



Open Project (MA, Hiwi)

Convergence and robustness of variational quantum algorithms

<p>Description:</p> <p>Quantum computers promise to revolutionize computing by efficiently solving previously intractable problems. Recent years have seen tremendous progress on both the experimental realization of quantum computing devices as well as the development and implementation of quantum algorithms. Variational quantum algorithms (VQAs) are among the most promising classes of quantum algorithms, containing a parameterized quantum algorithm with iterative parameter adaptation via a classical optimization algorithm.</p> <p>Mathematically, VQAs are feedback interconnections consisting of a discrete-time dynamical system (implemented on a classical computer) with a static nonlinear function (implemented on a quantum computer).</p> <p>In this project, you will study convergence and robustness properties of VQAs using tools from (robust) control theory. The goal is to establish conditions under which local convergence can be guaranteed and to verify the findings empirically in simulation and on a real quantum computer.</p> <p>Prerequisites:</p> <ul style="list-style-type: none">• Strong background in control theory and mathematics• Prior knowledge in quantum computing not necessary• Preliminaries: Konzepte der Regelungstechnik (required), Robust Control (beneficial)	<p>Supervisor:</p> <p>Julian Berberich Room 2.235</p>
	<p>Area:</p> <p>Robust control Quantum computing</p>
	<p>Properties:</p> <p>Type: MA, Hiwi</p> <p>30% literature 50% theory 20% implementation</p>
	<p>Beginning:</p> <p>now</p>

Weitere Informationen: www.ist.uni-stuttgart.de/lehre/bama

Aushang vom 21. Mai 2024