SQUANDER:
Variational Quantum Eigensolver

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Dear Reviewer,

My name is Balázs Menkó, and I am working on a project called Variational Quantum Eigensolver (VQE) as part of the course *Scientific Modeling Computer Lab* at Eötvös Loránd University. In this project, I am using the Sequential Quantum Gate Decomposer (SQUANDER) package[1] to simulate the VQE algorithm.

As the main focus of the project, I am using the *XXX Heisenberg* model and classical optimization methods to find the ground state eigenvalue of the Hamiltonian describing the quantum circuit.

I found that SQUANDER's built-in *Batched Line Search Strategy* reaches the ground state energy with fewer cost function evaluations than other methods.

Furthermore, I studied the behavior of the Hamiltonian generation process and found that varying either the node degree or the random seed does not significantly change the performance of the optimization methods.

For my source code and execution scripts, please refer to my GitHub repository[2]. These files are also available on Moodle.

Sincerely,
Balázs Menkó

[1] Available on GitHub: https://github.com/rakytap/sequential-quantum-gate-decomposer
[2] github.com/menkobalazs/SMC-Lab-SQUANDER