The Quantum Approximate Optimization Algorithm (QAOA) requires low circuit depth and produces interesting results even at a small number of qubits. The QAOA has been shown to perform well on certain combinatorial problems (1) but classical local techniques currently remain state of the art (2,3). Despite its success and acceptance in the field as a near term solution, there are still many questions on how QAOA performs against classical techniques on many combinatorial problems. We compare against a classical local heuristic for a localized version of MaxCut. This problem is localized by considering an assignment maximal if flipping any single vertex does not raise the overall weight. For graphs with vertex degree 2 (rings), our classical algorithm converges exponentially (*should rephrase to better convey in what sense it is converging*). We are still investigating the case of triangle-free bounded degree and already understand some certain scenarios in which this converges exponentially. For low depth, the classical algorithm outperforms the QAOA and we are exploring its performance on higher levels of *p*.

1. <https://arxiv.org/abs/1412.6062>
2. <https://arxiv.org/abs/1505.03424>
3. <https://arxiv.org/abs/1905.07047>