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Simulators for Quantum Information/Computation

Exciting new ideas have emerged in recent years concerning the application of quantum mechanical principles in information theory and computation. These developments show promise for new and powerful communication and computing technologies, though there are many significant practical hurdles.

This project concerns the simulation of quantum systems as arise in quantum information and computation, for example, simulation of qubits', entanglement, etc. The project will survey some existing software packages, and possibly write new software, with a view to creating some demonstrations of some novel quantum information/computation algorithms.

As background for the project, students should have some knowledge of complex variables, Hilbert space and analysis, as in MATH3320, and some quantum physics, as in PHYS2013. Computing skills would be advantageous, as in MATH3103. Suggestions for reading, software, etc, will be provided during the project.