

SYSTEMS AND METHODS FOR UNIFIED COMPUTING ON DIGITAL AND QUANTUM COMPUTERS

ABSTRACT

Computer systems and methods are provided for compiling a computer program to run on a quantum processor comprising a plurality of qubits, qudits or quantum continuous variables. A compiler obtains the program in a unified language, that is effectively a classical language, as opposed to a quantum language, and performs code refactoring on all or a portion of the program to form a refactored code and converts the refactored code into a first code. The compiler compiles the first code into a second code comprising a plurality of data elements in one or more quantum data structures. The compiler converts the second code to a third code expressed in a quantum gate-level language in accordance with an instruction set and gate locality constraints of the target quantum processor.

[Figure 1]