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INT CL **G06N**
Other: **EPO-Internal, WPI Data, INSPEC**

(54) Title of the Invention: **Cost function deformation in quantum approximate optimization**
Abstract Title: **Cost function deformation in quantum approximate optimization**

(57) Techniques for performing cost function deformation in quantum approximate optimization are provided. The techniques include mapping a cost function associated with a combinatorial optimization problem to an optimization problem over allowed quantum states. A quantum Hamiltonian is constructed for the cost function, and a set of trial states are generated by a physical time evolution of the quantum hardware interspersed with control pulses. Aspects include measuring a quantum cost function for the trial states, determining a trial state resulting in optimal values, and deforming a Hamiltonian to find an optimal state and using the optimal state as a next starting state for a next optimization on a deformed Hamiltonian until an optimizer is determined with respect to a desired Hamiltonian.

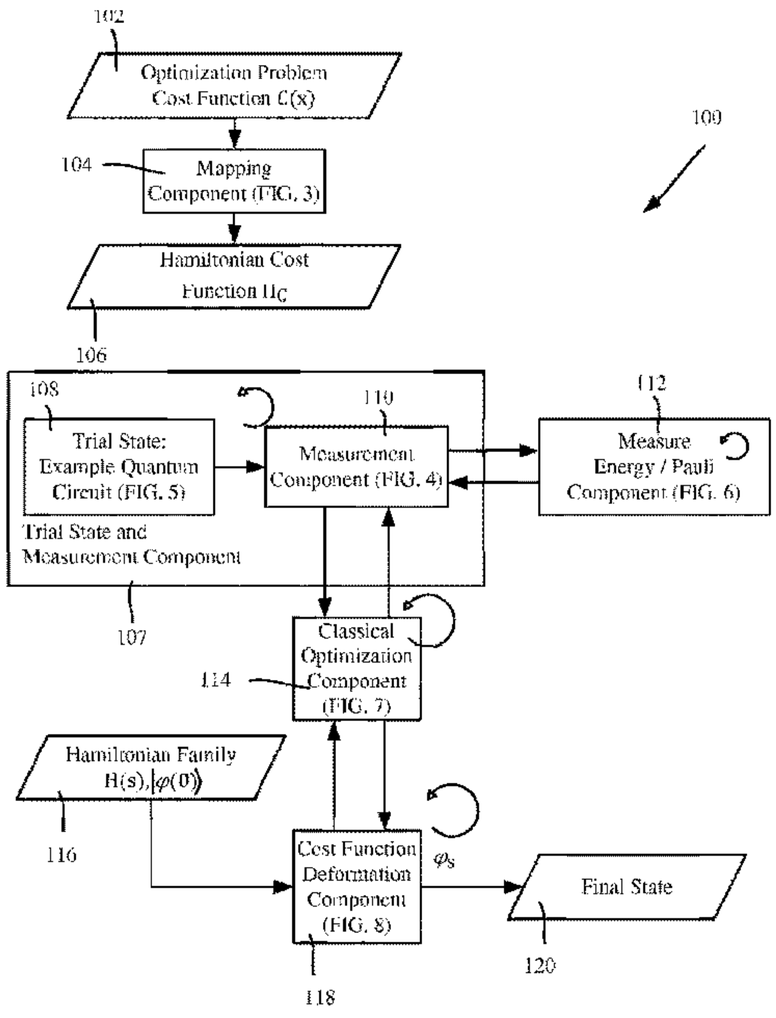



**FIG. 1**

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