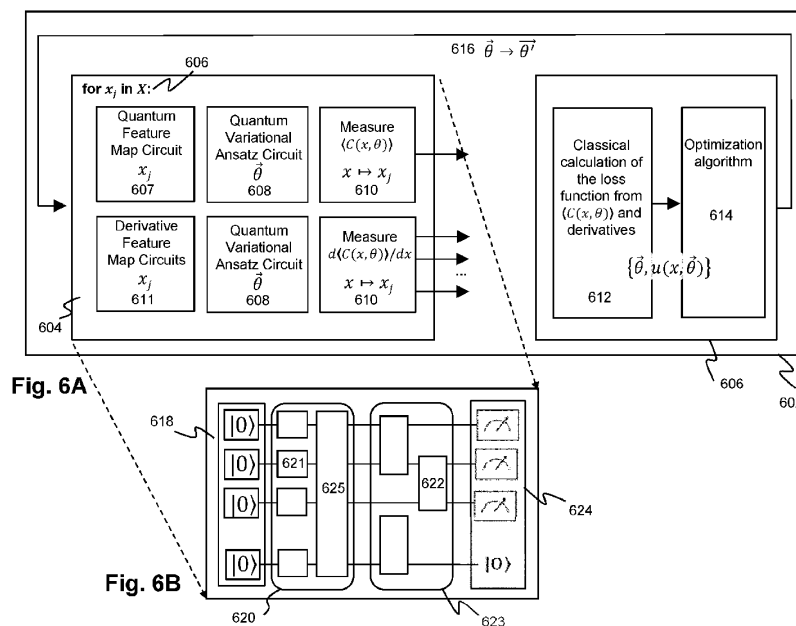




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(54) **Title:** SOLVING A SET OF (NON)LINEAR DIFFERENTIAL EQUATIONS USING A HYBRID DATA PROCESSING SYSTEM COMPRISING A CLASSICAL COMPUTER SYSTEM AND A QUANTUM COMPUTER SYSTEM



(57) **Abstract:** A method is described for solving a set of (non)linear differential equations, DEs, using a hybrid data processing system comprising a classical computer system and a quantum computer system wherein the method may comprise receiving or determining, by the classical computer system, a formulation of quantum circuits representing the set of DEs, the quantum circuits being parameterized by variables x of the DEs and including one or more function circuits for determining one or more trial functions values $f(x_j)$ around one or more points x_j and one or more derivative function circuits for determining one or more trial derivative values around the one or more points x_j ; executing, by the quantum computer system, the quantum circuits for a set of points x_j in the variable space x of the DEs; receiving, by the classical computer system, in response to the execution of the quantum circuits quantum, hardware measurement

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data; and, determining, by the classical computer system, on the basis of the quantum hardware measurement data and a loss function, if the quantum hardware measurement data forms a solution to the set of (non)linear DEs.