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Optimal Trajectories for Quantum Adiabatic Factoring JORDAN KYRIAKIDIS, ROBERT ARCHIBALD, Dalhousie Univeristy, WILLIAM MACREADY, D-Wave Systems, Inc. — We show how a classical multiplication circuit can be expressed as an optimization problem. The circuit can then be effectively run backwards by fixing the output states in the optimization problem and determining the corresponding input states, thereby factoring the output state. This can in turn be expressed as a problem in adiabatic quantum computing. We show by solving a coupled set of Euler-Lagrange equations how (locally) optimal trajectories from initial to final Hamiltonians can be found whose efficacy vastly exceeds that of the usual linear scaling trajectory. Explicit examples will be given for factoring 6-bit integers.

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