Towards a resolution of the Riemann hypothesis via quantum control

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An equivalence is established between optimal quantum control and Diophantine equations, polynomial equations with integer coefficients and integer unknowns. This implies that quantum control can be directly used to assess a rich variety of logical conjectures including the celebrated Riemann hypothesis. The negative resolution of Hilbert's tenth problem physically implies that quantum control problems are not algorithmically solvable in general. These findings reveal a deep connection between quantum evolution and the number theory.