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PT-Symmetric Quantum Evolution and Logic TOREY SEMI,
MARK COFFEY, Colorado School of Mines — There has been much recent interest in PT-symmetric quantum mechanics (QM) as an alternative formulation of
quantum theory. We investigate the potential of this formulation for quantum computation and simulation. PT-symmetric QM replaces the usual postulate that a
system's Hamiltonian must be Hermitian. It argues instead that the Hamiltonian
can be symmetric with respect to combined parity and time-reversal and, for certain parametric regions, still produce real eigenvalues and maintain unitary time
evolution. Besides being of fundamental interest, this approach allows for a fresh
perspective on many QM applications. It is known that for one-qubit PT-symmetric
systems the evolution time from an initial state to a final state can be made arbitrarily small. We report on applying PT-symmetric Hamiltonians for two-qubit systems
to quantum logic.

Torey Semi
Colorado School of Mines

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