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Quantitative treatment of decoherence LEONID FEDICHKIN, Clarkson University, ARKADY FEDOROV, Institut für Theoretische Festkörperphysik, Universität Karlsruhe, VLADIMIR PRIVMAN, Clarkson University — We outline different approaches to define and quantify decoherence. We argue that a measure based on a properly defined norm of deviation of the density matrix is appropriate for quantifying decoherence in quantum registers. For a semiconductor double quantum dot qubit, evaluation of this measure is reviewed. For a general class of decoherence processes, including those occurring in semiconductor qubits, we argue that this measure is additive: It scales linearly with the number of qubits.

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