Optimized dynamical control of state transfer through noisy spin chains

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We propose a method of optimally controlling state transfer through a noisy quantum channel (spin-chain). This process is treated as qubit state-transfer through a fermionic bath. We show that dynamical modulation of the boundary-qubits levels suffices to ensure state transfer with the best tradeoff of speed and fidelity. This is achievable by dynamically optimizing the transmission spectrum of the channel. The resulting optimal control is robust against both static and fluctuating noise in the channel’s qubit-qubit couplings.