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Title:	Multiple-spin coherence transfer in linear Ising spin chains and beyond: numerically-optimized pulses and experiments
Authors:	Dorai, K. (/jspui/browse?type=author&value=Dorai%2C+K.)
Issue Date:	2012
Publisher:	The American Physical Society
Citation:	Physical Review A, 85, 012325
Abstract:	We study multiple-spin coherence transfers in linear Ising spin chains with nearest neighbor couplings. These constitute a model for efficient information transfers in future quantum computing devices and for many multi-dimensional experiments for the assignment of complex spectra in nuclear magnetic resonance spectroscopy. We complement prior analytic techniques for multiple-spin coherence transfers with a systematic numerical study where we obtain strong evidence that a certain analytically-motivated family of restricted controls is sufficient for time-optimality. In the case of a linear three-spin system, additional evidence suggests that prior analytic pulse sequences using this family of restricted controls are time-optimal even for arbitrary local controls. In addition, we compare the pulse sequences for linear Ising spin chains to pulse sequences for more realistic spin systems with additional long-range couplings between non-adjacent spins. We experimentally implement the derived pulse sequences in three and four spin systems and demonstrate that they are applicable in realistic settings under relaxation and experimental imperfections-in particular-by deriving broadband pulse sequences which are robust with respect to frequency offsets.
Description:	Only IISERM authors are available in the record.
URI:	http://arxiv.org/abs/1110.5262 (http://arxiv.org/abs/1110.5262) https://journals.aps.org/pr/abstract/10.1103/PhysRevA.85.012325 (https://journals.aps.org/pr/abstract/10.1103/PhysRevA.85.012325)
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