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Deforming the Fredkin spin chain away from its frustration-free point KHAGENDRA ADHIKARI, K. S. D. BEACH, Univ of Mississippi — Salberger and Korepin have recently introduced a model of an $S = 1/2$ chain in which the interactions take the form of a singlet-pair projector that is correlated with the up or down character of the spin at a third, adjacent site. The model is frustration-free, and its exactly solvable ground state is an equal-weight superposition of spin states with a Dyck word structure. The state is highly entangled, and the excitation gap closes like inverse of the chain length cubed. We introduce a generalized model that interpolates between this so-called Fredkin spin chain and the conventional antiferromagnetic quantum Heisenberg model. We present numerical results that track the properties of the system as it is tuned between the two limits. The ground state is everywhere disordered, but the entanglement and gap scaling vary.

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