A non-Hermitian analysis of strongly correlated quantum systems
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HATANO, IIS. Univ. of Tokyo — We study a non-Hermitian generalization of
strongly correlated quantum systems in which the transfer energy of electrons is
asymmetric. Hatano and Nelson[1] applied this technique to non-interacting ran-
don electron systems. They related a non-Hermitian critical point to the inverse
localization length of the Hermitian systems. We here conjecture that we can ob-
tain in the same way the correlation length of Hermitian interacting non-random
systems[2]. We show for the Hubbard model and the antiferromagnetic XXZ model
in one dimension that the non-Hermitian critical point of the ground state, where
the energy gap vanishes, is equal to the inverse correlation length. We also show
that the conjecture is consistent with numerical results for S=1/2 frustrated quan-
tum spin chains with the nearest- and next-nearest-neighbor interactions including
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