A non-Hermitian analysis of strongly correlated quantum systems YUICHI NAKAMURA, Dept. of Phys., Univ. of Tokyo, Japan, NAOMICHI 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 random electron systems. They related a non-Hermitian critical point to the inverse localization length of the Hermitian systems. We here conjecture that we can obtain 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 quantum spin chains with the nearest- and next-nearest-neighbor interactions including the Majumdar-Ghosh model[3]. [1] N. Hatano and D. R. Nelson, PRL 77 (1996) 570; PRB 56 (1997) 8651. [2] Y. Nakamura and N. Hatano, Physica B, accepted. [3] C. K. Majumdar and D. K. Ghosh, J. Phys. C3 (1970) 911; J. Math. Phys. 10 (1969) 1388, 1399.

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