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Transport in flat band lattice models with Hermitian and non-Hermitian perturbations[1] HEE CHUL PARK, JUNG-WAN RYU, NOJOON MYOUNG, Center for Theoretical Physics of Complex Systems, IBS — We study the effect of Hermitian and non-Hermitian perturbations in flat band lattice models. In the flat band lattice models with non-Hermitian perturbations, we show that non-Hermitian degenerate points, so-called exceptional points, can appear in complex band structures. We also report additional dip and gap structures in transmissions, which cannot be appeared in band structures in cases of Hermitian and non-Hermitian perturbations, respectively. We investigate the Fano resonance and the unexpected band structure in a single particle transport on flat band lattice models. The imperfection of channel opening makes the particle to destructively interfere between transmitted and localized states due to the broken symmetry. In case of the non-Hermitian systems in which complex band structures can appear, PT symmetry gives rise to special degenerate points, so-called exceptional points, and the band gap emerges nearby flat band from this symmetric system satisfying energy balances.

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