Nonadiabatic Transition in the Quantum Hall Effect MANABU
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Aoyama Gakuin University — We analyze the nonadiabatic transition in a 2D elec-
tron system with a periodic potential in the quantum Hall regime. We obtain cor-
rections to the Chern-number term of the Hall conductance and a non-vanishing
diagonal conductance. We treat the electric field as a time-dependent vector po-
tential in the Hamiltonian. We calculate the time evolution of the density operator
taking account of the first order of the electric field, and thereby study the electric
conduction when the system evolves nonadiabatically. We thus obtain analytical
expressions of the diagonal and off-diagonal conductances and calculate them nu-
merically.

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