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【145】Quantised topological invariants and topological pumping in a one-dimensional open quantum system

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We employ the Ensemble Geometric Phase (EGP) - a generalisation of the Zak phase to mixed states - to analyse the topology of an open Su-Schrieffer-Heeger model involving both unitary Hamiltonian dynamics and dissipative coupling. For dissipation described by the Lindblad formalism, we discover regimes where the EGP is quantised to zero or pi, and relate the quantisation to the existence of an inversion symmetry. Furthermore, we devise topological charge pumping protocols by sequentially tuning hopping and system-bath couplings and realising an interplay between unitary dynamics and dissipation. We investigate the fate of this quantisation to situations of finite temperature through the Redfield master equation.

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