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Time-reversal symmetric expansion of the time evolution operator of open quantum systems NAOMICHI HATANO, Institute of Industrial Science, University of Tokyo, GONZALO ORDONEZ, Department of Physics and Astronomy, Butler University — We here consider open quantum systems of the tight-binding model, specifically a tight-binding chain with a scatter in the center. We succeeded in deriving a new expansion of the time evolution operator only with respect to the states of point spectra (bound, anti-bound, resonant and anti-resonant states), without the background integral over the continuum spectrum of scattering states. Since the expansion has no arbitrariness of the integration contour upon including decaying states, the expansion is perfectly symmetric under the time reversal. Among the expansion terms, the decaying resonant states naturally survive when we consider the time evolution from an initial condition, while the growing anti-resonant states naturally survive when we consider the time evolution to a terminal condition. This clearly shows that the emergence of the arrow of time is due to the choice of initial or terminal conditions, that it is not embedded in the time evolution itself.

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