

RESEARCH ARTICLE

**Semiclassical quantization of non-Hermitian 2-D systems: Classical
(Lie transform) Perturbation theory**

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Abstract: Both real and complex semiclassical eigen energies of two dimensional non-Hermitian Hamiltonian systems are obtained by classical (Lie transform) perturbation theory requiring the action variables I_1 and I_2 to satisfy the quantization condition $I_1=(n_1+(1/2))\hbar$ and $I_2=(n_2+(1/2))\hbar$ respectively where n_1, n_2 are integers. Classical perturbation theory with Lie transform makes classical trajectories, which are non-periodic or non-quasi-periodic, periodic. It was observed that this method produces accurate eigen energies even when classical trajectories are not periodic or quasi-periodic. Eigen energies obtained by classical perturbation theory are compared with the same, determined by Rayleigh-Schroedinger perturbation theory

Keywords: Lie transform, non-Hermitian systems, semiclassical quantization
