Riesz-projection based simulation and analysis of resonant photonic devices and machine-learning based parameter optimization

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Abstract

We present Riesz projection based methods relying on contour integration for efficiently computing quasi-normal modes and modal expansions of near-field and far-field physical quantities. We use a finite-element method based implementation of these methods for the analysis of nanophotonic resonators for quantumoptics applications. We use Bayesian optimization methods for finding best geometry parameters yielding, e.g., resonators with maximized quality factor.