Barycentric Interpolation Based on Equilibrium Potential

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A novel barycentric interpolation algorithm with specific exponential convergence rate is designed for analytic functions defined on the complex plane, with singularities located near the interpolation region, where the region is compact and can be disconnected or multiconnected. The core of the method is the efficient computation of the interpolation nodes and poles using discrete distributions that approximate the equilibrium logarithmic potential, achieved by solving a Symm's integral equation. It takes different strategies to distribute the poles for isolated singularities and branch points, respectively. In particular, if poles are not considered, it derives a polynomial interpolation with exponential convergence. Numerical experiments illustrate the superior performance of the proposed method.

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