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An Introduction to Approximation Theory

1. Introduction and Preliminary Observation

   - Norms, Convexity, Strict Convexity, Uniform Convexity

2. Weierstrass Theorem and Bernstein Polynomial

   - Weirestrass Theorem and the Bernstein Constructive proof of convergence

3. Best Uniform Approximation

   - Sufficient Conditions for Uniqueness of the Best Approximation, Characterization of the Best Approximation in the Uniform Norm, Jackson Theorems and It's Applications

4. Interpolation and Optimal Approximation

   - Optimal interpolation and Chebyshev polynomials

5. Best Approximation in L_2-norm and Orthogonal Polynomials

   - Orthogonal Polynomials and Best L_2 Approximation, Trigonometric Approximation

6. Properties of orthogonal polynomials

   - Orthogonal polynomials and it's applications in best L_2 approximation

7. Best L_1-norm Approximation

   - Existence and Uniqueness of the best approximation in L_1 norm

8. Piecewise Polynomials and Spline Theory

   - Interpolation and approximation using splines

9. High Dimensional Interpolation and Approximation using Radial Basis Functions

   - Radial basis functions and interpolation in higher dimension

10. Compressed Sensing and Best k-term Approximation

    - Introduction to CS and Best k-term approximation

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- and some recent papers.