Numerical Integration

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Numerical integration constitutes a broad family of algorithms for calculating the numerical value of a definite integral, and by extension, the term is also sometimes used to describe the numerical solution of differential equations. This article focuses on calculation of definite integrals. The term numerical quadrature (often abbreviated to quadrature) is more or less a synonym for numerical integration, especially as applied to one-dimensional integrals.

Numerical Integration

Numerical integration over more than one dimension is sometimes incorrectly described as cubature, since the meaning of quadrature is understood for higher-dimensional integration as well.

- ▶ Trapezoidal Rule
- ▶ Simpsons Rule

Numerical Integration: Simpson's Rule

$$\int_a^b f(x)\,dx \approx \frac{b-a}{6}\left[f(a) + 4f\left(\frac{a+b}{2}\right) + f(b)\right].$$

Trapezoidal Rule

$$\int_a^b f(x)\,dx \approx (b-a)\frac{f(a)+f(b)}{2}$$