

Complex Equations Test

Testing Complex Equation Rendering

This document tests the rendering of complex mathematical equations in LaTeX and PDF output.

Einstein Field Equations

The Einstein field equations relate the geometry of spacetime to the distribution of matter within it.

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

Schrödinger Equation

The Schrödinger equation describes how the quantum state of a physical system changes over time.

$$i\hbar \frac{\partial}{\partial t} \Psi(\mathbf{r}, t) = \hat{H} \Psi(\mathbf{r}, t)$$

Maxwell's Equations

Maxwell's equations describe how electric and magnetic fields are generated by charges, currents, and changes of each other.

$$\begin{aligned} \nabla \cdot \mathbf{E} &= \frac{\rho}{\epsilon_0} \quad \nabla \cdot \mathbf{B} = 0 \quad \nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \quad \nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \mu_0 \epsilon_0 \frac{\partial \mathbf{E}}{\partial t} \end{aligned}$$

Dirac Equation

The Dirac equation is a relativistic wave equation that describes the behavior of fermions.

$$(i\gamma^\mu \partial_\mu - m)\psi = 0$$

Path Integral Formulation

The path integral formulation of quantum mechanics describes the amplitude for a particle to travel from one point to another as a sum over all possible paths.

$$\langle q_f, t_f | q_i, t_i \rangle = \int_{q(t_i)=q_i}^{q(t_f)=q_f} \mathcal{D}q(t) \exp\left(\frac{i}{\hbar} S[q]\right)$$