

Hypergeometric Functions and Their Application Areas

Abstract

Essentially, the hypergeometric functions, which are a generalization of geometric series, are a special function. The most fundamental hypergeometric function is the Gaussian hypergeometric function defined by the series:

$${}_2F_1(a, b; c; x) = \sum_{n=0}^{\infty} \frac{(a)_n (b)_n}{(c)_n} \frac{x^n}{n!},$$

where

$$(a)_n = a(a+1)(a+2)\cdots(a+n-1)$$

is the Pochhammer symbol. Since this series also includes many other special functions as special or limiting cases, they are often seen as a "common framework" for specialized functions. This study provide informing on the structure, areas of application, and properties of hypergeometric functions.