Nonlinear Dynamics and Systems Theory, **24** (2) (2024) 159–167

# Conformable Fractional Inverse Gamma Distribution

Mamon Abu Hammad, Shameseddin Alshorm *, Sondos Rasem and Lena Abed

*Department of Mathematics, Al Zaytoonah University, Amman 11733, Jordan.*

Received: September 7, 2023; Revised: March 4, 2024

**Abstract:** In this paper, we will study the Inverse Gamma distribution to introduce the Conformable Fractional Inverse Gamma Distribution (CFIGD) with a study of the entropy measures in the fractional case. The CFIGD's CDF, survival function, and hazard function are defined to shed light on its behavior and suggest possible uses for it in reliability and risk analysis. It is possible to better understand the central tendencies and higher-order characteristics of statistics by using the conformable fractional analogs of statistical measures like the expected values, $r$-th moments, mean, variance, skewness, and kurtosis. In addition, the conformable fractional analogs of well-known entropy measures like the Shannon, Renyi, and Tsallis entropy are introduced, offering useful instruments for estimating uncertainty and randomness.

**Keywords:** *probability distribution functions; conformable fractional; conformable derivative; entropy.*

**Mathematics Subject Classification (2010):** 26A33, 34A08, 34K37, 70K75, 70K99.

## 1 Introduction

The Conformable Fractional Inverse Gamma Distribution (CFIGD), which offers an avant-garde framework for simulating various real-world phenomena, has emerged as a promising statistical tool [1,2]. The development of sophisticated tools to model complex phenomena and derive meaningful insights is made possible by advancements in probability theory and statistical analysis [3,4]. The CFIGD stands out among these tools as a potent and ground-breaking idea, providing a new viewpoint on probability distributions and their applications. The CFIGD and its numerous applications in various fields will be thoroughly explored in this research paper.

* Corresponding author: alshormanshams@gmail.com