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# EXTENDED GENERALIZED $\tau$-GAUSS' HYPERGEOMETRIC FUNCTIONS AND THEIR APPLICATIONS

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**Abstract:** In this article, by means of the extended beta function, we introduce new extension of the generalized $\tau$-Gauss' hypergeometric functions and present some new integral and series representations (including the one obtained by adopting the well-known Ramanujan's Master Theorem). We also consider some new and known results as consequences of our proposed extension of the generalized $\tau$-Gauss hypergeometric function.

**Keywords and Phrases:** Extended Beta function, Generalized $\tau$-Gauss' hypergeometric function, Ramanujan's Master theorem.

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## 1. Introduction

New extensions of some of the well-known special functions (e.g. gamma function, beta function, Gauss hypergeometric function, etc.) have been extensively studied in the recent past. By inserting a regularization factor $e^{-pt^{-1}}$, Chaudhry et.al. [4] have introduced the following extension of the gamma function:

$$\Gamma_p(x) = \int_0^\infty t^{x-1} exp(-t - \frac{p}{t}) dt \qquad (\Re(p) > 0), \tag{1.1}$$