

## On Some Gamma, Inverted Gamma and Gamma Slash Distributions

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The gamma distribution have been used extensively to fit rainfall data, traded volume in financial market, species abundance. This distribution has also been found effective in the study of voice activity detection study. A four parameter gamma distribution has been defined to fit the data related to rainfall, financial market, species abundance. Moreover, a inverted three parameter gamma distribution has been derived. Various known, viz., Chi, Rayleigh, Maxwell, etc., and new distributions may be generated considering different values of the parameters of these distributions. A few properties of these distributions has been considered. Finally, we introduce a new family of univariate gamma slash-distributions. Let  $S$  be the standard gamma slash distribution with parameter  $q > 0$  if  $S$  can be expressed as

$$S = \frac{X}{U^{\frac{1}{q}}}, \quad (1)$$

where  $X \sim G(\lambda)$  and  $U \sim U(0,1)$ .  $G(\lambda)$  represents a one parameter gamma distribution with parameter  $\lambda$  and  $U(0,1)$  represents rectangular distribution. We denote this as  $S \sim GSL(q)$ . Setting  $q = 1$  yields the canonical gamma slash distribution. In case  $q \rightarrow \infty$ , the  $GSL$  tends to one parameter gamma distribution. The representation (1) is found to be most useful for studying properties of the corresponding family. For instance, the standard density function for the general case is readily found to be given by

$$f(x) = q \int_0^1 u^q g(xu) du, \quad (2)$$

where  $g(x) = \frac{1}{\Gamma(\lambda)} x^{\lambda-1} \exp(-x)$  is the one parameter gamma distribution.

Various properties of this distribution has been discussed. The proposed distributions have been demonstrated with insurance and demographic data.