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On Some Characterizations of the Mixture of Gamma Distributions

Abstract: Following Gupta and Wesolowski (1997), in this work, under the condition $\frac{X}{U}|U$ has a beta distribution, and given X the conditional expectation of certain function of (U, X) . This problem is related to Lukacs type characterization, where under some mild conditions, both X and Y have to be gamma distributed with the same scale parameter, if both X and Y , and $\frac{X}{X+Y}$ and $X + Y$ are independent. Among others, we prove that if $\frac{X}{U}|U$ is $Be(p, 1)$ distributed, and $E(\sum_{i=1}^n a_i(U - X)^i|X) = b$, where a_1, \dots, a_n, b , are constants, then both U and X have mixed gamma distributions.