A CHARACTERIZATION OF CERTAIN DISCRETE EXPONENTIAL FAMILIES

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Abstract. For independent random variables X and Y, define $S \equiv X + Y$. When the conditional expectations $E[g(X) \mid S] \equiv a(S)$ and $E[h(X) \mid S] \equiv b(S)$ are given, then under certain assumptions, the density function of X has the form of $u(x)k(\alpha)e^{\alpha x}$, where $u(x)$ is uniquely determined by the functions $a(\cdot)$ and $b(\cdot)$.

Key words and phrases: Characterization, conditional expectation.