

On some bivariate discrete distributions with multivariate components

By JOHN PANARETOS (Columbia, Missouri) *)

Abstract

Consider a random vector $(\underline{X}, \underline{Y})$ where $\underline{X}=(X_1, X_2, \dots, X_s)$ and $\underline{Y}=(Y_1, Y_2, \dots, Y_s)$ with $X_i, Y_i, i=1, 2, \dots, s$ independent non-negative, integer-valued random variables with finite support and such that $\underline{X} \cong \underline{Y}$. We show that in the case where the distribution of $(\underline{Y}|\underline{X}=n)$ is of a certain structural form then there exists a relationship between the distributions of \underline{Y} and of $\underline{Y}|\underline{X}=\underline{Y}$ which uniquely determines the distribution of \underline{X} . The relationship in question is less stringent than the condition of independence between \underline{Y} and $\underline{X}-\underline{Y}$ usually involved in problems of this nature. Examples are given to illustrate the result. The case where $\underline{X}, \underline{Y}$ have infinite support has been examined earlier by the author.

Keywords and Phrases. Finite Distributions, Conditional Distribution, Multiple Binomial Distribution, Multiple Hypergeometric Distribution, Characterization.

AMS 1980 Subject Classification: Primary: 62H05, Secondary: 60E05.