

SOME UNIFYING TECHNIQUES IN THE THEORY OF ORDER STATISTICS

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ABSTRACT

Let X_1, \dots, X_n be any n random variables (rv's) and let $X_{1:n} \leq \dots \leq X_{n:n}$ denote the same variables arranged in nondecreasing order. Then $X_{r:n}$ is called the r th order statistic, $r = 1, \dots, n$. When one of the X 's is dropped at random, there results a simple relation between the order statistics in the original and the reduced samples. This "dropping" argument will be shown to provide a unified approach to establishing recurrence relations between moments of order statistics, whatever the dependence structure of the observations. Also useful in studying recurrence relations is the classical theorem on the probability of occurrence of r events out of n .

It will also be shown that a simple general method of obtaining universal bounds for linear functions of order statistics in terms of the sample standard deviation can be based on Cauchy's inequality coupled with convexity arguments.

Keywords: Recurrence relations; "dropping" argument; universal bounds; Cauchy's inequality; convexity.