Ann. Inst. Statist. Math.
Vol. 40, No. 1, 93-99 (1988)

CHARACTERIZATION OF CONDITIONAL COVARIANCE AND UNIFIED THEORY IN THE PROBLEM OF ORDERING RANDOM VARIABLES

KENTARO NOMAKUCHI[1] AND TOSHIO SAKATA[2]

[1]*Department of mathematics, Faculty of Science, Kyushu University, Higashi-ku, Fukuoka 812, Japan*
[2]*Faculty of General Education, Kumamoto University, Kumamoto 860, Japan*

(Received May 23, 1986; revised August 28, 1986)

Abstract. Under the assumption that a $(p+q)$-dimensional row vector (Y, X) is elliptically contoured distributed, the conditional covariance of Y given $X=x$ is characterized in the context of correctly ordering the coordinates Y_k's of Y based on X. This is an answer to a conjecture implicit in Portnoy (1982). Moreover some unified theory is presented for the problem of ordering Y_k's based on X. An essential tool is the decreasing in transposition (D. T.) function theory of Hollander *et al.* (1977, *Ann. Statist.*, **5**(4), 722–733).

Key words and phrases: Linear predictor, ordering r.v.'s, elliptically contoured distribution.