ON A TWO-STAGE PROCEDURE HAVING SECOND-ORDER PROPERTIES WITH APPLICATIONS

NITIS MUKHOPADHYAY AND WILLIAM DUGGAN

Department of Statistics, University of Connecticut, Storrs, CT 06269-3120, U.S.A.

(Received December 3, 1997; revised June 18, 1998)

Abstract. Under a fairly general setup, we first modify the Stein-type two-stage methodology in order to incorporate some *partial information* in the form of a known and positive lower bound for the otherwise *unknown nuisance parameter*, $\theta(> 0)$. This revised methodology is then shown to enjoy various customary *second-order properties and expansions* for functions of the associated stopping variable, under appropriate conditions. Such general machineries are later applied in different types of estimation as well as selection and ranking problems, giving a sense of a very broad spectrum of possibilities. This constitutes natural extensions of these authors' earlier paper (Mukhopadhyay and Duggan (1997*a*, *Sankhyā Ser. A*, **59**, 435–448)) on the fixed-width confidence interval estimation problem exclusively for the mean of a normal distribution having an unknown variance.

Key words and phrases: Consistency, second-order expansions, confidence regions, point estimation, regret, selection and ranking.