CONTROLLING TYPE II ERROR WHILE CONSTRUCTING TRIPLE SAMPLING FIXED PRECISION CONFIDENCE INTERVALS FOR THE NORMAL MEAN

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Abstract. The rationale and methodology for estimating a mean with a fixed width confidence interval through sampling in three stages are extended to cover the additional problem of testing hypotheses concerning shifts in the mean with controlled Type II error. The coverage probability and operating characteristic function of the confidence interval based on the integrated approach are derived and compared with those of the usual triple sampling confidence interval. The extended methodology leads to better coverage probability and uniformly better Type II error probabilities. Achieving the additional objective of controlling Type II error inevitably implies a two- to threefold increase in the required optimal sample size. Some suggestions for dealing with this apparent limitation are discussed from a practical viewpoint. It is recommended that an integrated approach to estimation and testing based on confidence intervals be incorporated in the design stage for credible inferences.

Key words and phrases: Coverage probability, operating characteristic function, optimal design.