

Stat 215B (Spring 2005): Two formulas for simultaneous confidence intervals

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Suppose we are interested in simultaneous confidence intervals for linear combinations of the form $c'\beta$. We will look for $100(1 - \alpha)\%$ confidence intervals. There are two methods we can use.

Scheffé Simultaneous Intervals

$$c'\hat{\beta} \pm s\sqrt{qF_{q,n-p}^{(1-\alpha)}}\sqrt{c'(X'X)^{-1}c}$$

where q is the number of independent linear combinations for which we are constructing intervals (i.e. the rank of the contrast matrix).

Bonferroni Simultaneous Intervals

$$c'\hat{\beta} \pm t_{n-p}^{(1-\alpha/(2l))}s\sqrt{c'(X'X)^{-1}c}$$

where l is the number of linear combinations we are computing intervals for.