Inferences about Inverse Probabilities in Binary and Bounded-Response Regression

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Abstract

Inverse probabilities such as the LD50, ED05 and so on are widely used as risk assessment parameters in binary response regression. Estimates are derived by inverting the estimated regression relationship. Motivated by the need to estimate thresholds in effect studies of ultrasound, we extend the notion of inverse probabilities to bounded response regression problems such as tobit regression. Because the inverse probability parameter is a nonlinear transformation of the regression parameters, ordinary delta method inferences may be suspect. We develop bootstrap and likelihood inferences and compare them with the delta method.