STANFORD UNIVERSITY

DEPARTMENT OF STATISTICS

DEPARTMENT SEMINAR

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Probit Models for Handicapped Horse Racing

In their seminal work on horse racing, Bolton and Chapman (1986) proposed a model for estimating individual horse win probabilities from fundamental data. Because of limitations in the computing facilities and methods available at that time, the authors chose the multinomial logit model, which arises from the theoretically sub-optimal assumption that the errors in estimated horse performance follow the negative double-exponential distribution. In this talk, we consider models that are based on the more natural assumption that those errors follow the normal distribution. We call such models probit models. We overcome the computational difficulties associated with the probit model by applying the Markov chain Monte Carlo stochastic approximation algorithm developed in Gu and Zhu (2001). A likelihood ratio procedure for testing parameters is also devised. We apply both logit and probit methodologies to a data set composed of 1000 races from Hong Kong Jockey Club during the 1998 to 2000 seasons. Hold-out simulation betting shows a significant improvement for the probit model over the logit model.

Based on Joint work with Dr Changquan Huang and William Benter