Directed Studies VHM 881 Course
Fall 2009, Atlantic Veterinary College, PEI
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Home Assignment 1

The home assignment consists of 4 parts (below), which all should be answered. The home assignment is due on Wednesday, October 28, 2009. It is worth 15% of the course mark. All aids except personal assistance are allowed.

The topic of the home assignment is maximum quasi-likelihood (MQL) and maximum likelihood (ML) estimation for generalised linear models.

Part 1
Exercise E 5.3 in the textbook (McCulloch, Searle & Neuhaus, 2008).

Part 2
Exercise E 5.11 in the textbook. Supplement this large-sample comparison of ML and MQL estimates by a study of small-sample properties based on simulation; for this part, you are allowed to use the code provided on the course homepage of 2004, but you may want to modify it to match your study.

Part 3
Exercise 7.2 of Venables & Ripley (2002). Include in your analysis also fits based on the quasi-likelihood function (i.e. MQL) for both links. Compare the model fit for the different analyses you have carried out. Make sure to include also relevant plots of observed and predicted proportions.

Part 4
Write a small summary (1–2 pages) about MQL and ML estimation in generalised linear models in which you explain the two methods and contrast their respective assumptions and advantages, including their large-sample and small-sample performances. Include in the summary the discussion in the textbook, the findings from Parts 1–2 plus the paper by Firth (1987) referred to in the textbook, and your experience with the procedures from Part 3.