BAYESIAN INFERENCES ON NONLINEAR FUNCTIONS OF THE PARAMETERS IN LINEAR REGRESSION

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Abstract. A variety of statistical problems (e.g. the x-intercept in linear regression, the abscissa of the point of intersection of two simple linear regression lines or the point of extremum in quadratic regression) can be viewed as questions of inference on nonlinear functions of the parameters in the general linear regression model. In this paper inferences on the threshold temperatures and summation constants in crop development will be made. A Bayesian approach for the general formulation of this problem will be developed. By using numerical integration, credibility intervals for individual functions as well as for linear combinations of the functions of the parameters can be obtained. The implementation of an odds ratio procedure is facilitated by placing a proper prior on the ratio of the relevant parameters.

Key words and phrases: Bayesian inferences, threshold temperatures, summation constants, regression, intervals of highest posterior density, posterior odds ratio.