

Evaluation of Circular Logistic Regression Models with Asymmetrical Link Functions

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This research mainly focuses on a circular logistic regression models between a binary response and a “circular” predictor variable which can be considered as an angular or directional variable. Traditional logistic regression method uses specific link functions to estimate probability of occurrences of binary responses (0 or 1) using the predictor variable. If the probability of the binary response approaches to 0 at a different rate than as it approaches to 1 (unbalanced binary response variable), a selection of symmetric link function may not be appropriate to estimate the model parameters. Most common link functions that are used in logistic regression models are logit and probit which are considered symmetric link functions. On the other hand, cloglog (Extreme Value Distribution) and skewed logit functions are used as asymmetric link functions which can be considered as alternative link functions when a binary response variable consists of unbalanced binary variable. So, the evaluation of all four link functions by employing the Akaike Information Criterion (AIC) and Deviance measures under the assumptions of balanced and unbalanced binary response variable and real life circular data examples will be presented.