An Extended Beta Regression Mode

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The four parameter logistic regression model is commonly used in bioassay or immunoassay experiments.

$$Y = B - rac{B-A}{1+e^{-(
ho+qx)}} + \epsilon$$
 , $\epsilon \sim N(0,\sigma^2)$

Two disadvantages:

• Parameter A and B are interpreted as the minimum and maximum of possible responses, but model allows the responses to be unbounded.

• Responses have equal variance for all possible values of covariate X. Beta regression model has covariate depended variance, but responses are bounded between zero and one.

Extended beta model

- Two unknown boundaries.
- Covariates depended variance.
- Mean function is analogous to the mean function of four parameter logistic function.



Response of Extended Beta Regression Model

Dose