

## Vita

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## Tweedie Mixed Models for Unevenly Spaced Longitudinal Data

UNIVERSITY OF NEW BRUNSWICK

REPORT DEFENCE AND EXAMINATION

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by

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in the Department of Mathematics & Statistics

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Via MS TEAMS

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## Abstract

In Longitudinal set-ups, we often need to face many instances where we must deal with successive count responses given at unevenly spaced time intervals. In these scenarios, we consider the study designs to be complete, as opposed to an evenly spaced design with non-response or missing values.

In dealing with the variably spaced longitudinal data sets, here we propose a method to estimate parameters for unevenly spaced longitudinal data by working with the flexible class of Tweedie generalized linear mixed models, with both subject-specific and time-specific random effects. This class of models are able to handle a variety of data types, including continuous, discrete and mixed data.

The proposed method is demonstrated with the analysis of patient-controlled analgesia dataset from Henderson and Shimamura (2003), with the exception of omitting the ‘no response’ values for the individuals from the dataset as they are neither a missing response, nor can they be qualified as a zero, and thus creating an unbalanced dataset.

To maintain the accuracy of the correlations in real studies, the duration of the time intervals is generally kept small, leading to a large value of  $T$  (total number of intervals). For inferences, the regression parameters are estimated by the scoring method and the unevenly spaced correlation parameters of random effects by using moment estimators.