Spring 2022 **Lealand Morin**

University of Central Florida
College of Business

QMB 6912
Capstone Project in Business Analytics

Problem Set #9

In this problem set, you will revisit the Generalized Additive Model of the regression specification in Problem Sets #7 and #8. This time, we will use a Box–Tidwell transformation to transform the continuous explanatory variables.

First, make sure that you understand the relationships and similarities between these modeling options. Compare the method of using the Box–Cox transformation with that of fitting a GLM, with the Box–Tidwell transformation, or a Generalized Additive Model. Explain the difference between using the Box–Cox transformation and the other two modeling approaches.

Reconsider the variables for which you investigated nonlinear relationships with the dependent variable. Determine whether any of these observed relationships have functional forms similar to any transformations in the family defined by the Box-Cox transformation that you used for Problem Set #6 to analyze the dependent variable. Estimate a model with the Box–Tidwell transformation applied to your chosen explanatory variables. The `car` package can be used to estimate a model with a Box–Tidwell transformation.

Use this framework to test the hypothesis of a constant depreciation rate across age (in years) versus one that varies across age. Determine whether the ordinal categories of damage levels can be summarized with a transformation of this variable in a numeric form.

Compare the results to those from the regression specification in Problem Sets #7 and #8, and then decide whether it does better than your chosen specification at explaining the data. Recommend a final model and be sure to consider the level of complexity, in addition to the predictive performance of your model, when making your recommendation.

Due Date: Thursday, 14 April 2022, before the beginning of class.