

1135-VV-1249 **Naama T. Lewis*** (tleelay1@siu.edu), 1240 Lincoln Drive, Carbondale, IL 62901. *Convex Optimization Techniques: A view point in Item Response Theory Models using I-projections*. Preliminary report.

Item Response Theory (IRT) Models have been used for many years to analyze the properties and behaviors of test items and the interaction between test items and respondents. More recently, with the use of computer algorithms to estimate the parameters, researchers have begun to develop and describe more complex interactions and models for test, test items, and examinee interactions. This dissertation work will place traditional IRT models within the framework of an I-projection problem. We will extend the 1 dimensional I-projection case into multiple dimensions, connect the solution to the 1-Parameter IRT model, estimate item parameters based on simulated data, and propose new models based on the I-projection dual space functional model. By expanding I-projections into multiple dimensions, we are able to recover and uncover properties of IRT models that were otherwise over looked when considering the same or similar models outside of the dual space and relate our new models to multidimensional IRT data. (Received September 20, 2017)