Item selection criteria for Logistic Positive Exponent model-based Computerized Adaptive Testing

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In a Computerized Adaptive Test (CAT), the items of the evaluation are selected from a bank according to the examinee's abilities in order to avoid to present items that are too easy or too dificult to him/her. In this way, we can interpret that the item selection criteria used in a CAT would choose items with correct response probability close to 50%. Considering symmetric Item Response Theory (IRT) models and Fisher information function for item selection, this is equivalent to match difficulty levels of test items with an examinee's ability. However, for asymmetric models and other item selction criteria, this equivalence may not be true. The aim of this work is to analyse three item selection methods (Fisher Information criterium, Kullback-Leibler information criterium and Continuous Entropy Method) under an asymmetric IRT model (logistic positive exponent) in terms of the difficult parameters and probability of correct response of the selected item. The simulations show that the selected items do not have a 50% probability of correct response in either of the three methods. In this way, further studies are proposed to indicate an adequate item selection criteria for LPE model-based CAT.

Keywords: Item Response theory; Fisher Information Function; Kullback Leibler information function; Continuous Entropy Method.