

Item Response Theory: A Comprehensive Guide by Robert Gibbons

Item response theory (IRT) is a powerful statistical framework used in psychometrics to analyze the relationship between examinee responses and item characteristics. It provides a mathematical model for understanding how examinees perform on tests, with the goal of making inferences about their underlying abilities and the difficulty of the items. IRT has a wide range of applications in educational measurement, psychological testing, and other fields where it is necessary to assess individual abilities or traits.

The Rasch Model

One of the most well-known IRT models is the Rasch model, named after the Danish mathematician Georg Rasch. The Rasch model assumes that the probability of an examinee answering an item correctly is a logistic function of the difference between the examinee's ability and the item's difficulty. The logistic function is a sigmoid curve that ranges from 0 to 1, with the steepness of the curve determined by the item's discrimination parameter.



Item Response Theory by Robert D. Gibbons

★★★★★ 5 out of 5

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The Rasch model can be used to estimate the ability of examinees and the difficulty of items. It can also be used to identify items that are biased or unfair, and to develop tests that are more reliable and valid.

The Logistic Regression Model

Another common IRT model is the logistic regression model. The logistic regression model is a more general version of the Rasch model that allows for the inclusion of additional predictors, such as examinee demographics or item content. The logistic regression model can be used to estimate the effects of these predictors on item responses.

The logistic regression model is a powerful tool for understanding the complex relationships between examinee responses and item characteristics. It can be used to develop more accurate and informative tests, and to make more informed decisions about examinees.

The Graded Response Model

The graded response model is a type of IRT model that is used to analyze items that have multiple response options. The graded response model assumes that the probability of an examinee selecting a particular response option is a logistic function of the difference between the examinee's ability and the item's difficulty. The graded response model can be used to estimate the ability of examinees and the difficulty of items. It can also be used to identify items that are biased or unfair, and to develop tests that are more reliable and valid.

Computerized Adaptive Testing

Computerized adaptive testing (CAT) is a type of testing that uses IRT to administer tests to examinees. CAT systems adjust the difficulty of the items that are presented to each examinee based on their performance on previous items. This allows for more efficient and accurate testing, as examinees are only presented with items that are appropriate for their ability level.

CAT systems are used in a variety of applications, such as educational testing, psychological testing, and medical diagnosis. CAT systems can provide more accurate and reliable results than traditional paper-and-pencil tests, and they can be more efficient and cost-effective.

Item response theory is a powerful statistical framework that has a wide range of applications in psychometrics. IRT models can be used to estimate the ability of examinees, the difficulty of items, and the effects of other predictors on item responses. IRT can also be used to develop more accurate and reliable tests, and to make more informed decisions about examinees.

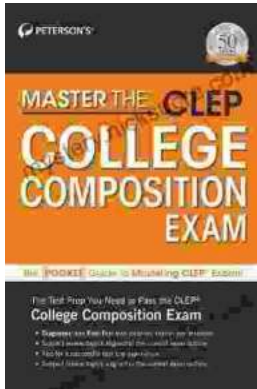


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