Homework assignment
L7: IRT models for ordinal and nominal items

Assignment date:	**26.11.2019**
Deadline:	**03.12.2019 23:59**
Slides:	http://www.cs.cas.cz/martinkova/NMST570
Note:	Send answers and R script to hladka@cs.cas.cz
Name:	

1   Training in ShinyItemAnalysis

Run ShinyItemAnalysis online or locally.

Ex. 1.1   Finish Exercise in IRT/Training/Polytomous models tab for graded response model. Provide proof (screenshot). [3.5]

Ex. 1.2   Finish Exercise in IRT/Training/Polytomous models tab for generalized partial credit model. Provide proof (screenshot). [1]

2   Real data analysis

Consider neuroticism data neuroticism500.csv available at

http://www.cs.cas.cz/hladka/documents/neuroticism500.csv

Use pseudo R code

http://www.cs.cas.cz/hladka/documents/NMST570_HW7.R

modify it and answer following questions

Ex. 2.1   Describe basic properties of the dataset:

1. How many items and how many respondents are in the data? [0.125]

2. How are the items rated? [0.125]

Ex. 2.2   Consider graded response model and use mirt library.

1. Fit graded response model with the same discrimination for all items. Provide table with discrimination and location parameters for each item. [0.5]

2. Fit graded response model with no constrain. Provide table with discrimination and location parameters for each item. [0.5]

3. Use some criteria to decide between these two models. [0.5]

4. For the better fitting model, plot category response curves for all items. [0.25]

5. For the better fitting model, plot item information curves for all items in one plot. [0.25]

6. For the better model, plot test information function. For which type of respondents is the instrument the most informative? [0.5]

3   Reading

Read "Empirical Example" in chapter 7 "Partial Credit Model" of Handbook of Item Response Theory, volume 1 and answer following questions.

Ex. 3.1   Describe data used in empirical example

1. How many markers judged the quality of essays? [0.125]

2. What was the grade scale used by markers? [0.125]

3. How many essays did each marker mark? [0.125]

Ex. 3.2 Read "Measuring Essay Quality" and answer following questions:

1. Briefly describe how was the quality of essays estimated. [0.25]

2. What was the best quality essay? [0.125]

3. What was the least quality essay? [0.125]

4. Briefly describe marking patterns in Essay 22 (Figure 7.2). [0.5]

Ex. 3.3 Read "Calibrating Markers".

1. Briefly describe how was the behavior of markers assessed. [0.25]

2. Markers 57, 25, 43, and 24 are describes as "typical", "harsh", "lenient", and "noncommittal". Briefly describe why. [0.75]

3. Explain why different uses of grades does not have to be source of misfit. [0.125]

4. Provide an example of how it could be avoided of different use of grades. [0.25]

4   Provide feedback

Here you can provide feedback on lecture, lab session and/or materials (slides, HW assignment, `ShinyItemAnalysis` manual) [1pt bonus] :)