Using interactive JSXGraphs in STACK tasks on probability theory and statistics

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Production of STACK video tutorials (German/English)
Field of research: Feedback in digital exercises

Parts of the talk were prepared in collaboration with
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Background of our project

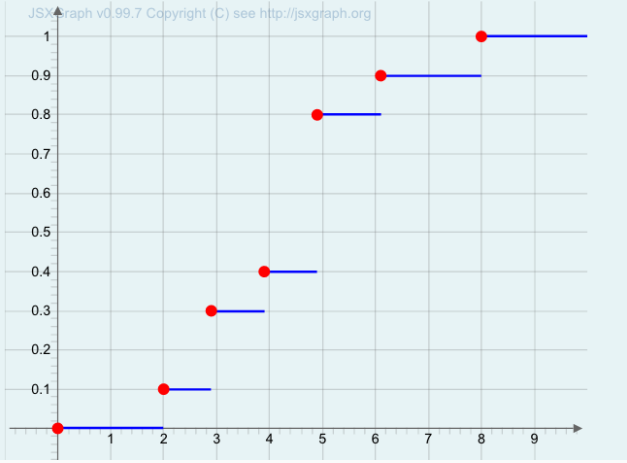
- Our goal: Using the possibilities of **digital media** for improving the teaching of probability theory and statistics
- Development of digital materials for use in mathematics courses $\rightarrow$ core of the *OER.Stochastik.nrw* project
- Team of mathematicians and mathematics educators from three German universities
- Three types of materials:
  - Interactive applications
  - Instructional videos
  - Digital mathematical tasks
- All materials will be available as Open Educational Resources (OER) on the portal `https://orca.nrw` by the end of the project

What do I show in this talk?

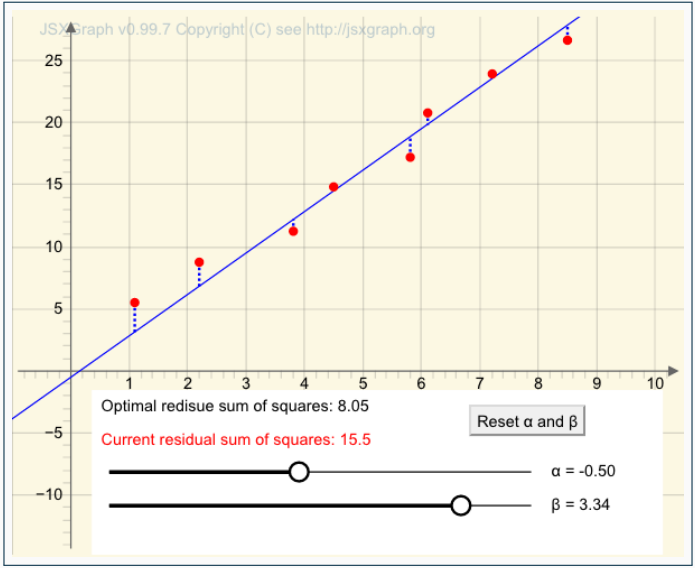
- Connecting STACK tasks with interactive JSXGraph elements
- Three different sample tasks to demonstrate three different approaches:
  1. **Drawing an empirical distribution function**
     $\rightarrow$ Students construct a solution actively instead of just changing sliders or moving objects
  2. **Specify a regression line**
     $\rightarrow$ Students change their initial answer by performing changes in a graphic that appears in the specific feedback
  3. **Constructing a random experiment (probability mass function)**
     $\rightarrow$ Students can see their mistakes when seeing that their solution can be empirically disproved (random experiment in the feedback)

Drawing an empirical distribution function

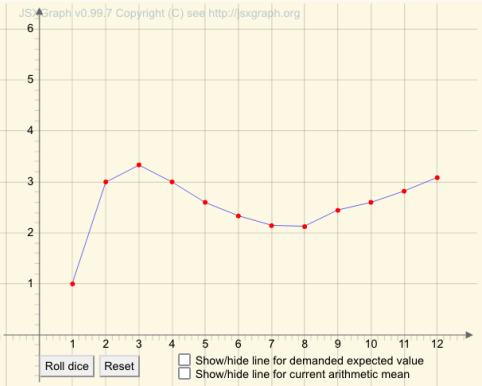
Draw the empirical distribution function of these data points by adding points to the coordinate system with a mouse click. You can remove a point already added by clicking on it.



Specify a regression line



Constructing a random experiment (probability mass function)



Current result:

Result	⚀	⚁	⚂	⚃	⚄	⚅	number of rolls	arithm. mean
absolute frequency	4	2	0	2	3	1	12	3.08
relative frequency	0.33	0.17	0	0.17	0.25	0.08		

Thanks for attending my talk!

I am looking forward to your questions

Please contact me

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