Mathematical Writing

"A mathematical text is also a German text!" (Beutelspacher 2004:3, own translation)
→ The same applies to texts in other languages!

"If you cannot say what you want with one sentence, try saying it with two!" (Beutelspacher 2004:4, own translation)
→ The same applies to diagrams!

"Every sentence you write must have a purpose (that you are able to describe)!" (Beutelspacher 2004:5, own translation)
→ The same applies to all formulas and diagrams!

Important: Ask the faculty and your lecturers about the relevant requirements!

Formulas

General Information on Formulas

"Fundamentally important for formulas is that the symbols and use of brackets, fraction bars, root signs, etc. are unambiguously identifiable. A well presented formula allows the reader to understand the mathematical structure of the shown dependency at first sight." (Friedrich 1997:70-71, own translation)

- Each variable must have the same meaning throughout the entire paper. Communicate this meaning to the reader. → Provide an index of variables and formulas.
- Present all formulas in the paper in a consistent way. → Use a formula editor or similar tool even for the simplest formulas.
- Number your formulas and equations for future reference.
- Adjust the size of elements such as brackets to match the preceding and following symbols. Write e.g. outer brackets large enough to enclose the inner ones.
- In equations with several sets of brackets, use different bracket types (round, box, curly). Important: For sets, intervals, etc. the type of bracket matters!
- Ensure you have a matching number of opening and closing brackets.

Naming Variables

"A good name should be unambiguous, concise and easy to remember; it must avoid any disadvantageous second meaning [...]; the order and connection of the signs should suggest the order and connection of the objects". (Polya 1995:77, own translation)

- Use standard labels or names that are self-explanatory.
- Give similar objects similar names.
- Highlight relationships between different objects by their names.
- Introduce only those names you actually need.
- Use the same name for the same concept.
- Use consistent capitalisation.
- Use simple numbering as far as possible.
- Don't get desperate if these rules contradict each other at times. ;-)

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Mathematical Writing

Equations

- Use the equals sign only if both sides are actually equal or should be equal.
- Important: No part of an equation may be omitted.
- Equals signs may only be placed between objects of the same type. This also applies to units.
- Place all equals signs in a calculation one below the other and at the height of arithmetic operators and fraction bars.
- The same applies for approximately equals sign and relational signs.

Mathematical Symbols in a Text

- Use mathematical symbols exclusively in their mathematical meaning.
- Avoid using dashes whenever possible.
- Connect number and unit with a non-breaking space (key combination in MS Word: “ctrl” + “shift” + “space bar”).
- Separate two combinations of mathematical symbols with at least one word.

Diagrams

A good diagram …
… reinforces the message of the text.
… does not contain unnecessary information.
… is easy to understand and self-explanatory.
… is carefully designed and constructed.

- Present all diagrams in the paper in a consistent way.
- Choose diagram types that are suitable for the type of data, e.g. do *not* use continuous lines for discrete or nominally scaled data.
- Size the diagram so that all the important details are easy to recognise, the diagram is clear and not overloaded.
- Ensure a meaningful, comparable, and justifiable scaling of the axes.
- Recommendation: If you (have to) edit data for a diagram, attach the original data to the appendix so that your editing can be traced.
- Provide each diagram with axis labels (including units), a diagram title, and a legend.
- Number and label each diagram.
- Create an index of figures and diagrams if your paper contains a large number of them.
- Refer to each diagram at least once in the text.

Literature

- Beutelspacher, A. (2004): *„Das ist o. B. d. A. trivial!“: Tipps und Tricks zur Formulierung mathematischer Gedanken*. Wiesbaden: Vieweg.
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- http://de.wikipedia.org/wiki/Formelsatz. Abgerufen am 04.12.2024.
- Polya, G. (1995): *Schule des Denkens: Vom Lösen mathematischer Probleme*. Tübingen u. a.: Francke Verlag.

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