Mathematics

Computational Pangenomics – Summer 2020

Tizian Schulz

May 20 2020

General Things

- **variables within text in italics** ($...$)
- do not use the same variable name for different things
  "The sequence alignment score s [...]. Let us now consider sequence $s =$`ACGT`."
- avoid $\text{sub}_{scripts}$ and $\text{super}^{scripts}$.
- do not begin sentences with variable names.
- repeat the type of variable when using a variable, but be careful with the placing of the variable:
  "The values are represented in a list of numbers L.
  $\rightarrow$ "The values are represented in a list of numbers L."

Clarity

"In mathematical writing it is essential to be precise. [Zobel]"'

"Not every peace of math is an equation or formula!"

Example

"An inverted list for a given term is a sequence of pairs, where the first element in each pair is a document identifier and the second is the frequency of the term in the document to which the identifier corresponds."

$\rightarrow$ "An inverted list for a term t is a sequence of pairs $\langle d, f \rangle$, where each d is a document identifier and f is the frequency of t in d.

Clarity

Be careful with terms that already have a mathematical meaning:

- “normal”
- avoid “definite”, “strict” and “proper”
- be careful with “all” and “some”
- “formula” $\neq$ “equation”
- “element”:

Clarity

Be careful with terms that already have a mathematical meaning:

- "partition":
- "average" vs. "mean"
- "(strict) subset": similar with: $\leq$, $<$, "monotonic"
- "metric" vs. "measure"

Readability

"$p \leftarrow q_1 \wedge \cdots \wedge q_n$ is a conditinal dependency."

"The dependency $p \leftarrow q_1 \wedge \cdots \wedge q_n$ is conditional."

Readability

"The values are represented as a list of numbers L."

"The values are represented as a list L of numbers."

Readability

"For each x_i, $1 \leq i \leq n$, x_i is positive."

"Each x_i, where $1 \leq i \leq n$, is positive."

Readability

$$\text{“}f(x) = e^{2^{-\frac{b}{a}x\sqrt{1-\frac{a^2}{x^2}}}}\text{”}$$

$$\text{“}f(x) = e^{2^{g(x)}} \quad \text{where } g(x) = -\frac{b}{a}x\sqrt{1-\frac{a^2}{x^2}}\text{”}$$

Definitions

Definitions, Theorems etc.

- should be self-contained
- usually contain an (implicit) "Given..." part followed by a "Then..." part
- should be put into context/introduced/explained.
  Do **not** just rephrase a complex formula in words, but explain the meaning!

Beautify

Always beautify!

- take care of the spacing, e. g. : $+x$ (sign) vs. $+\ x$ (addition)
- take care of line breaks
- do not use 'x' or $\times$ as multiplication symbols, but $\cdot$ or just a space.
- use parentheses in different sizes: $\left(\sum \dots\right)$
- $x_1 + x_2 + \cdots + x_n$ vs. $x_1, x_2, \dots, x_n$