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ISO rules for typesetting mathematics

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Abstract. Using ISO standards for mathematical notation is important for improving the quality of scientific paper presentation. This article describes the key requirements of ISO standards for mathematical notation. It also provides recommendations for the notation of differential operators.

Key words and phrases: typesetting mathematics standards, ISO, LaTeX

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1. ISO standards

When typesetting mathematics, standards must be followed.

ISO standards represent strict rules for the typesetting of mathematical data in the fields of physics and applied sciences. ISO standards are not free, but they are the reference standard for all typography guidelines.

Standards:

- ISO 31-11:1992 (https://en.wikipedia.org/wiki/ISO_31-11). Superseded by ISO 80000-1:2009, ISO 80000-2:2019.
- ISO 80000-1:2009/Amd 1:2021 — Quantities and units — Part 1: General (https://www.iso.org/standard/76921.html, https://en.wikipedia.org/wiki/ISO/IEC_80000) [1]. General principles: number notation, decimal sign, digit grouping, rules for units of measurement.
- ISO 80000-2:2019 — Quantities and units — Part 2: Mathematics (https://www.iso.org/standard/64973.html) [2]. The basic standard for mathematical typesetting rules: italic/roman font, notations for functions, derivatives, imaginary units, etc.

2. Brief description of the standard

The essence of the standard is that the mathematical role of a symbol should be immediately clear from its design.

2.1. Variables

The word *variable* is used to denote a mathematical entity representing variable data.

Variables are denoted by a single letter. Abbreviations are not permitted. [1]. Some abbreviations have become widely popular and used, but they are prohibited by ISO rules.

Variables are displayed in italics. If capital Greek letters denote a variable, they are also italicized (remember that in standard LaTeX, they are upright by default).

2.2. Quantities

The word *quantity* is used to denote any physical entity that can be measured according to metrological practice.

All quantity symbols should be italicized; oblique fonts are permitted, but italicized serif fonts should be preferred unless ISO regulations specify a sans-serif font:

- mathematical constants: numbers whose value does not change should be upright (e.g., e, i, π);
- differential symbol d should be upright to avoid confusion with the physical quantity d;
- number e should be upright to avoid confusion with the elementary electric charge e;
- The imaginary unit j in electrical engineering (i in other sciences) should be written in roman font to avoid confusion with the electric current density j or electric current i;
- The transcendental number $\pi = 3.14159$ should be distinguished from the angle π, etc.

2.3. Other designations

All characters that do not represent quantities should be set in a roman font, preferably a serif font, except where ISO rules require a sans-serif font:

- the rule includes numbers and their digits, and characters representing constant numerical values;
- mappings are not quantities or variables: for example, in the expression V_i, the subscript i is variable because it represents the ith element in a sequence such as V_0, V_1, V_2,...;
- if the subscript is an addition, such as "i" meaning "input", it is written in roman: V_i.

Matrices are typed in bold italic:

- single-column matrices are vectors and should be treated like any other matrix;
- multi-row and multi-column matrices are typed in uppercase;
- lowercase letters are reserved for vectors;
- geometric vectors, which are typed using uppercase or lowercase italic letters with an arrowhead, are not considered by ISO rules.

Tensors should be typed in an italic, bold, sans-serif font.

Labels for geometric objects such as points, segments, and angles (not their dimensions) should be in sans-serif fonts. The same rule applies to labels used in sketches and drawings representing mechanisms, electrical circuits, and the like, when the label refers to the object rather than its dimension.

Notes for general (non-standard) functions are always italicized (e.g., x, $f(x)$). Standard functions (e.g., sin, cos, ln) are typed in roman font.

[1] In programming, identifiers are called variables in the sense that they can represent variable data, but computer programs are not mathematics.

3. Software used

3.1. Packages for XeLaTeX and LuaLaTeX

For XeLaTeX and LuaLaTeX, you can use the `unicode-math` package (https://ctan.org/pkg/unicode-math). This package provides full control over fonts in formulas for XeLaTeX and LuaLaTeX. It allows you to choose a font where all symbols are natively ISO-compliant (for example, constants are direct). When using `unicode-math`, many older math packages (`amssymb`, `mathrsfs`, etc.) become unnecessary, since their symbols are now directly accessible.

3.2. Packages for pdfLaTeX

Since it is not possible to implement all the features using a standard font in this case, it is necessary to use a set of packages that provide similar features.

- `PM-ISOmath`[2] (https://www.ctan.org/pkg/pm-isomath). Instead of loading new mathematical alphabets, the package defines a number of user-defined macros and workarounds for properly formatting characters in pdfLaTeX without exhausting the limited allocations for mathematical groups. Focuses on the core user-defined macros needed for standard ISO-compliant characters.
- `isomath` (https://www.ctan.org/pkg/isomath). Loads and defines special new mathematical alphabets and font slots for bold italic and bold italic sans-serif. May result in the error *too many mathematical alphabets*. Configures full mathematical alphabets for Latin and Greek characters. Provides explicit semantic markup commands for vectors, matrices, and tensors.
- `mismath`. The package implements a set of macros for ISO-compliant typesetting.

3.3. Additional packages

- `siunitx`. For the set of units of measurement in accordance with ISO requirements [3].
- `derivative`. A package for setting derivatives and differentials. Since these operators are widely used, we will examine this package in more detail.

4. Derivative package

The `derivative` package is a modern solution for typesetting derivatives, differentials, and integrals in LaTeX. It is designed as a direct, safe, and extremely convenient replacement for the **`\dv`** and **`\pdv`** commands from the legacy `physics` package.

CTAN: https://www.ctan.org/pkg/derivative.

Repository: https://github.com/sjelatex/derivative

The package is written in LaTeX3. It works in any engine (pdfLaTeX, XeLaTeX, LuaLaTeX) and does not require encoding or font changes. The package uses semantic markup. The author specifies what needs to be obtained (ordinary derivative, quotient, differential), and the package takes care of proper spacing, argument order, and correct display.

4.1. Basic commands and basic syntax

The core of the package consists of four families of commands similar to those used in the `physics` package, but with more logical and predictable behavior.

[2] The Poor Man ISO math bundle.

Ordinary derivatives are entered using **\odv** (ordinary derivative).

Ordinary derivatives

```
\(\odv{f}{x}\)\\
\(\odv[n]{f}{x}\)\\
\(\odv[delims-eval=.|]{f}{x}_{x=0}\)\\
\(\odv*{f}{x}\)
```

$$\frac{\mathrm{d}f}{\mathrm{d}x}$$
$$\frac{\mathrm{d}^n f}{\mathrm{d}x^n}$$
$$\frac{\mathrm{d}f}{\mathrm{d}x}_{x=0}$$
$$\frac{\mathrm{d}}{\mathrm{d}x}f$$

Partial derivatives are defined by the operator **\pdv** (partial derivative).

Partial derivatives

```
\(\pdv{f}{x}\)\\
\(\pdv[2]{f}{x}\)\\
\(\pdv{f}{x}{y}\)\\
\(\pdv[order={2,1}]{f}{x,y}\)\\
\(\pdv[order={n}]{f}{x}\)\\
\(\pdv[order={2,3}]{f}{x,y}\)\\
\(\pdv{f}{x,y,z,k,l}\)
```

$$\frac{\partial f}{\partial x}$$
$$\frac{\partial^2 f}{\partial x^2}$$
$$\frac{\partial f}{\partial x}y$$
$$\frac{\partial^3 f}{\partial x^2\,\partial y}$$
$$\frac{\partial^n f}{\partial x^n}$$
$$\frac{\partial^5 f}{\partial x^2\,\partial y^3}$$
$$\frac{\partial^5 f}{\partial x\,\partial y\,\partial z\,\partial k\,\partial l}$$

If the order of the derivative is not explicitly specified, the package automatically calculates the sum of the orders for mixed derivatives, assuming the order of each variable is equal to 1.

Differentials are specified by the operators **\odif** (ordinary differential) and **\pdif** (partial differential).

Differentials

```
\(\odif{x}\)\\
\(\pdif{x}\)\\
\(\odif{f(x)}\)\\
\(\odif[2]{x}\)\\
\(\int f(x) \odif{x}\)
```

$$\mathrm{d}x$$
$$\partial_x$$
$$\mathrm{d}f(x)$$
$$\mathrm{d}^2 x$$
$$\int f(x)\,\mathrm{d}x$$

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References

[1] *Quantities and units – Part 1: General*, ISO 80000-1:2022, Geneva, Switzerland: ISO, Nov. 2, 2023.
[2] *Quantities and units – Part 2: Mathematics*, ISO 80000-2:2019, Geneva, Switzerland: ISO, Sep. 15, 2019.
[3] D. S. Kulyabov, A. V. Korolkova, L. A. Sevastianov, and Y. P. Rybakov, "Physical dimensional quantities typesetting," *Discrete and Continuous Models and Applied Computational Science*, vol. 34, no. 1, pp. 5–11, 2026. DOI: 10.22363/2658-4670-2026-34-1-5-11

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Правила ISO для набора математики

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Аннотация. Использование стандартов ISO для набора математики важно для повышения качества представления научных работ. В статье описываются основные требования стандартов ISO для набора математики. Кроме того, даются рекомендации по набору дифференциальных операторов.

Ключевые слова: стандарты набора математики, ISO, LaTeX