MY ARTICLE

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1. Introduction

A good introduction to fractal geometry is Falconer [1]. There is `smallmatrix` environment (e.g, $\left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix}\right)$). It is recommended to use $\ldots, \cdots, \cdots, \cdots, \ldots$ instead of $\ldots$ and $\cdots$. Then we test the `\nobreakdash`: p-adic, page 1–9, n-dim, 1-dim, σ-algebra. What about a text-mode fractional: $\frac{\log_k H}{1212}$.

Then for the `\xleftarrow`:

$$(1.1) \qquad A \xleftarrow{n+\mu-1} B \xrightarrow[T]{n\pm i-1\text{bla, bla, bla}} C \underset{i\geq 1}{\cap} A_i \bigcup_{k=1}^{100} \Upsilon_k$$

$$\Leftrightarrow$$

Compare the `\choose` and `\binom` : $\binom{n}{k}\binom{n}{k}$. $|z|, \|v\|, \|v\|_\infty$.

About the user-defined math operators:

$$\mathrm{ex}(\mathrm{conv}(A_i)) \operatorname*{abc}_{x\to 0} \operatorname*{Lim}_{n\to\infty}$$

Then the `mod`: $\gcd(n, m \bmod n); \quad x \equiv y \pmod{b}, x \equiv y \mod c, x \equiv y \;(d)$.

See the following default math environments:

$$(1.2) \quad \vec{F} = m\vec{a}$$

$$\vec{F} = G\frac{m_1 m_2}{r^2}$$

1

$$(1.3a) \qquad\qquad \nabla \cdot \vec{E} = \varepsilon_0 \rho$$

$$(1.3b) \qquad\qquad \nabla \cdot \vec{B} = 0$$

$$(1.3c) \qquad\qquad \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$

$$(1.3d) \qquad\qquad \nabla \times \vec{B} = \mu_0 \varepsilon_0 \vec{J} + \frac{\partial \vec{E}}{\partial t}$$

$$(1.4) \qquad\qquad E = \gamma m c^2$$
$$\mathcal{R}_{\mu\nu} - \frac{\mathcal{R}}{2} g_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

- \substack{} and \begin{subarray}

$$(1.5) \qquad\qquad \operatorname*{Lim}_{\substack{0 \le i \le m \\ 0 < j < n}} P(i,j)$$

$$(1.6) \qquad\qquad \sum_{\substack{i \in \Lambda \\ 0 < j < n}} P(i,j)$$

♡ \sideset{text}{right}{symbol}

$$a_0 + \cfrac{1}{a_1 + \cfrac{1}{a_2 + \cfrac{1}{a_3 + \cdots}}}$$

$$(1.7) \qquad {}^*\!\!\prod_{\substack{* \\ n=1}}^{\infty}{}^* \left[{}^*\!\!\prod_{*n=1}^{*\infty} \; \sum_{\text{ex}} \; \prod_{\lim_{n\to\infty}}^{\infty}{}_{n=1} \right] \Bigg\} \lim_{n\to\infty} \text{Quantum Computing}$$

The \mathbf command is commonly used to obtain bold Latin letters in math, but for most other kinds of math symbols it has no effect.

\mid and \mathbin{} : $P(A \mid B) P(A \mid B) P(A|B)$

(a) f : X\to Y vs. f\colon X\to Y: $f : X \to Y$ vs. $f\colon X \to Y$.
(b) := vs. \colonequals : := vs. :=.
(c) $\{z : z \in \mathbb{Z}\}$ vs. $\{z\colon z \in \mathbb{Z}\}$.
(d) $v_1, v_2, \ldots, v_n$ vs. $v_1, \ldots, v_n$.

(e) $f(n) = O(n)$ vs. $f(n)$ is $O(n)$ or $f(n) \in O(n)$.

(f) $A \setminus B$ vs. $A \backslash B$ vs. $A - B$.

(g) There is a `\,` spacing between integrand and measure

$$\int_a^b x^2 \, dx$$

(h) Use `text`

Here is some practical suggestions for mathematical writting.

(1) The structures for conditional sentences: `If ...`, `then...`; `When...`, `...`; `For ...`, `....` No `Let....` `Then...`!

(2) Avoid using `as` and `for` to introduce reasons after some conclusion.

(3) `Hence`, `Thus`, and `Therefore`, .

(4) `, so` is informal and should be used when the conclusion is short.

(5) A statement that is `assumed` is an axiom, and throughout to be true. Something `supposed` is a hypothesis and more appropriate to introduce a case or an argument by contradition. For example, `Suppose to the contrary that` and `Toward a contradiction, suppose that`.

(6) No v`'s` or a_i`'s`.

(7) No *nested* proof environments.

(8) `We induct on n` vs. `We use induction on n`.

(9) Prefer `pairwise` to `mutually`.

(10) No contractions like `can't`, `won't`, etc.

(11) Use `\begingroup\allowdisplaybreaks ... \endgroup` to allow the large chunk of math display environments to be broken into pages.

(12) Replace `$$ ... $$` with `\[...\]` in `sed`:

```
sed '/\$\$/{:x;N;/.*\$\$ *$/!bx;s/\$\$\(.*\)\$\$ *$/\\[\1\\]/}'
```

2. Commutative diagrams

Arrows `@>>>` `@<<<` `@VVV` `@AAA`. Double lines: `@=`. Null arrows: `@`

(2.1)

$$
\begin{array}{ccc}
S^{\mathcal{W}_\Lambda \otimes T} & \xrightarrow{\ j\ } & T \\
\Big\| & & \Big\downarrow \scriptstyle{\mathrm{End}\,P} \\
(S \otimes T)/I & =\!=\!= & (Z \otimes T)/J
\end{array}
$$

`tikzcd` is the ultimate answer to a commutative diagram in TEX.

$$A \xrightarrow{\phi} B$$
$$\searrow$$
$$C$$

References

[1] K. J. Falconer. *Fractal geometry : mathematical foundations and applications.* Wiley, Chichester, 2003. 1

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