1 Font in \LaTeX

We should use the Times font for our paper because Times font is thinner so that we can get more content in the same amount of pages. But using \usepackage{times} alone is not sufficient because your math is in the Computer Modern Math font. Therefore, your paper does not look good because the Times font and the Computer Modern Math font don’t mix well together.

We can use either the mathtime package or the mtpro2 package. If you use mtpro2, you can compile your \LaTeX code only on tahoe.

2 Theorems and lemmas

Mathematicians and computer scientists view theorems and lemmas differently. From a mathematician’s point of view, a theorem is a major result of independent interest. However, from a computer scientist’s point of view, a theorem is a major result of a chapter or a section. A lemma is a helping result. It helps you to get to the theorem you want to prove. The distinction between a theorem and a lemma can be subtle. A corollary’s proof is usually very short. You often can use fewer than two sentences to prove a corollary.

We should use a Q.E.D. box to end a theorem, lemma, or corollary.

We often state our proof techniques in a proof. If the proof is long, the structure should be clear. The following is a good example:

Topic paragraph: We will show X and Y, which will imply Z.
Topic sentence: We start by showing X.
Topic sentence: Now we show Y.
Topic sentence: Having shown X and Y, now we prove that they imply Z.
Concluding paragraph or sentence: Thus, we see that X and Y, and hence Z.

We do not need \textit{if and only if} when defining a term. \textit{If} is sufficient.

\textit{Bad}: A directed graph is strongly connected if and only if there exist paths from each vertex to all other vertices.

\textit{Good}: A directed graph is strongly connected if there exist paths from each vertex to all other vertices.
3 Notation

People can easily notice wrong notation. In what follows, we present how to get notation right in your writing.

All notation should use math mode. You should use roman, not italic, font for constant function names. You can use \texttt{mbox{}} in math mode to set the correct font for your own function names. For example, $\texttt{mbox{height}}(x)$ gives height(x). \LaTeX{} provides macros for some function names, such as $\texttt{\sin}$ and $\texttt{\min}$.

\textbf{Bad:} $\texttt{sin} \ x$, $\texttt{min}(a, b)$

\textbf{Good:} $\texttt{\sin} \ x$, $\texttt{\min}(a, b)$

We should try to avoid using lowercase letters with uppercase subscripts, for example $a_N$. Do not use different fonts to denote different variables, e.g., $A$ and $A$.

Math is always a part of a sentence, and it should be punctuated as such. It is good to have a little space between math and the punctuation in display mode, e.g.,

\[ F = ma. \]

Otherwise the punctuation would look like a part of the math. It is particularly bad when the last symbol is a number because the period looks like a decimal point.

Inline math needs no space before punctuation. If there are multiple equations, and the equations are inline, put \texttt{and} before the last one.

Many math operators are verbs. It is OK to use math symbols as verbs in the sentence, but not as the main verb.

\textbf{Bad:} We have $a \mod b < b \ \forall \ a, b$.

\textbf{Good:} We have $a \mod b < b$ for all $a, b$.

We can also use \texttt{we have} to avoid using math symbols as the main verb.

\textbf{Bad:} Since $x \in A$ implies $x \in B$ for all $x, A \subseteq B$.

\textbf{Good:} Since $x \in A$ implies $x \in B$ for all $x$, we have $A \subseteq B$.

Do not start a sentence with math or a number.

\textbf{Bad:} $s$ is the source vertex.

\textbf{OK:} Vertex $s$ is the source.

\textbf{Good:} The source vertex is $s$.

If you are writing about complex numbers, do not use the letter $i$ as an index. Do not use letter $j$ if you are an electrical engineer.

If you want a pipe symbol, use $\mid$ instead of $|$.

\textbf{Bad:} $\{a | a \equiv 0 \pmod{5}\}$

\textbf{Good:} $\{a | a \equiv 0 \pmod{5}\}$
There are three epsilons in \LaTeX: \epsilon, \in, and \varepsilon. Do not write \( k^{\text{th}} \). The correct way is \( k \text{th} \).

There are two ways to write multiple parentheses in one equation. You can put all parentheses in the same size, or you can make parentheses bigger outside. Both ways are good.

Assume should be followed by that.

\textit{Bad}: Assume \( M \) is invertible.

\textit{Good}: Assume that \( M \) is invertible.

We can use \( \text{and} \) to connect two equations. One line should have only one equation in display mode.

\textit{Bad}:

\[ x = y \text{ and } a = b . \]

\textit{Good}:

\[
\begin{align*}
x &= y, \\
a &= b .
\end{align*}
\]

Tom says that if an equation is too long to fit in one line, breaking it after a binary operator looks better because the reader can easily see that the expression is not complete.

\textit{OK}:

\[
\begin{align*}
z &= a + b + c + d \\
    &\quad + e + f
\end{align*}
\]

\textit{Good}:

\[
\begin{align*}
z &= a + b + c + d + \\
    &\quad e + f
\end{align*}
\]

Higham says the opposite: break before a binary operator.

A formula is not the same thing as an equation. For example, an inequality is a formula that is not an equation.

If you need to show a list such as \( \{2, 3, 5, 7\} \), don’t delimit it by less-than and greater-than signs, because they are too sharp. You can use \texttt{angle} and \texttt{rangle} for left and right angle brackets.