Mathematics

“Math is prose.” In many academic fields, mathematical expressions (equations, formulas, etc.) are part of the language and therefore should be incorporated into the text as such. Simple expressions such as \( \cos x = 0.5 \) or \( x^2 + y^2 = r^2 \) may be included “in line;” however, a more involved example must be “displayed,” that is, presented on a line separate from the main text body. For example:

“We apply the time-dependent Schrödinger equation

\[ -\frac{\hbar^2}{2m} \nabla^2 \Psi + V \Psi = i\hbar \frac{\partial \Psi}{\partial t}, \] (4.16)

where \( V \) is the potential....” Note, however, that even displayed equations are part of the text and must be punctuated accordingly (as illustrated by the comma at the end of equation [4.16] in the example above).

All displayed mathematical expressions should be centered between the margins or else are all to be indented by one inch from the left margin. Either way, add extra vertical spacing before and after the expression to help the reader visually isolate the expression you are displaying.

It is highly recommended that you number all of your displayed expressions; you never know which expressions other people will want to refer to later, and they should not be forced to refer to an equation through clumsy constructions such as “the equation just before the third full paragraph on page 27.” It is recommended that each equation number should be of the form \( a.b \) where \( a \) and \( b \) are Arabic numerals denoting the chapter number, and equation number within that chapter, respectively. The equation number can be placed either flush right (as in the examples above), but standard practice in your discipline may be to place it flush...
left, indented left, or indented right. In any case, be consistent throughout the document.

There are several acceptable conventions for referencing mathematical expressions by their number, as illustrated by the following examples:

According to Equation (3.1), ...
According to equation (3.1), ...
According to Equation 3.1, ...
According to equation 3.1 , ...

We don’t care which of these conventions you follow; just choose one and be consistent. However, try to avoid saying

According to (3.1), ...

Although this is a standard convention in many journals, it can be confusing when “3.1” might refer to a section, figure, or table, as well as an equation. Also note that expressions such as

\[ |x^2 + y^2| < 1 \quad (3.2) \]

should not be referred to as “Equation (3.2)” (this is not an equation, but an inequality), and we encourage terms such as “expression (3.2)” or “Emslie’s law (3.2)”, whatever blends well into the text.

Be consistent in your use of fonts and symbols for mathematics. Do not, for example, refer to a particular entity as “f” in one line and as “f” in another. If you are using a general purpose word processing program, such as MS Word, then it is strongly recommended that you use an equation editor (and not just, for example, italicized font) for writing all of your mathematical expressions (both those “in line” and those “displayed”) and for all your symbols as well, whether they occur within an equation or within a line of text. If your work requires a substantial amount of mathematics, then you should seriously consider using technical word
processing/typesetting software such as TeX or LaTeX, which do a much better job of typesetting technical content. For example, in TeX the example above is entered as the rather (at first sight) unfriendly text

"We apply the time-dependent Schrödinger equation

$$ - \frac{\hbar^2}{2m} \nabla^2 \Psi + V \Psi = i \hbar \frac{\partial \Psi}{\partial t}, \tag{4.16} \$$

where $V$ is the potential"

but appears in the final document in a rather pleasing format:

"We apply the time-dependent Schrödinger equation

$$ - \frac{\hbar^2}{2m} \nabla^2 \Psi + V \Psi = i \hbar \frac{\partial \Psi}{\partial t}, \tag{4.16} \$$

where $V$ is the potential"

**List of Symbols**

In most theses or dissertations involving a significant amount of mathematics, it is helpful for the reader (and the author!) to construct a "List of Symbols," which forms part of the "front matter" (see page ??). This list should, at a minimum contain an alphabetized list of symbols used (with Greek and other fonts either inserted at "logical" places – e.g., $\alpha$ after $a$, $\beta$ after $b$, etc. – or in a separate alphabetized list at the end). Constructing such a list of symbols can alert you to duplicate notation problems at an early stage (before most of the equations are written) and save the need for considerable rewriting. It will also help the reader identify the meaning of symbols readily. You may choose to include in your list a page number or equation number where the symbol first appears.
Figures, Tables, and Photographs

A table or figure should appear close to your first reference to it in your text. Smaller tables and figures may appear on a page with text; larger ones may require an entire page, or may be divided to extend over two regular, numbered, single-sided pages. They may not be placed on facing pages, nor may you use fold-out pages.

All tables, figures, and photographs must be in perfect focus and must fit within margins specified for the document as a whole, and must be printed on the same bond paper as the rest of the document. All pages of tables, figures, and photographs, or pages including them must have page numbers placed as specified for the document as a whole regardless of whether the item is placed horizontally or vertically on the page.

All tables, figures, and photographs must be numbered, captioned, and must include a citation (if you are reprinting an item) in the same system as your in-text citations. The number, caption, and citation must use the same font and size as your text. If you are using copyrighted material, you must also indicate that you are reprinting by permission.

Oversized tables or figures may be divided over consecutive pages. The caption line appears only on the first page. However, if you are continuing a table or figure onto a second page, the top line of the page must be headed, Table 3 (continued), or Table 2.3 (continued). Placement on the line—left or center—must be consistent with the placement used for caption line throughout the thesis or dissertation. Any information essential to reading a table or figure (for example, headings over the columns of a table) must be repeated on subsequent pages of a multi-paged table or figure.