1 Sample Mathematics and Text

1.1 In-line and Displayed Mathematics

The expression $\sum_{i=1}^{\infty} a_i$ is in-line mathematics, while the numbered equation

$$\sum_{i=1}^{\infty} a_i \tag{1}$$

is displayed and automatically numbered as equation 1.

Let H be a Hilbert space, C be a closed bounded convex subset of H, T a nonexpansive self map of C. Suppose that as $n \to \infty$, $a_{n,k} \to 0$ for each k, and $\gamma_n = \sum_{k=0}^{\infty} (a_{n,k+1} - a_{n,k})^+ \to 0$. Then for each x in C, $A_n x = \sum_{k=0}^{\infty} a_{n,k} T^k x$ converges weakly to a fixed point of T [1].

Two sets of LaTeX parameters govern mathematical displays.[1] The spacing above and below a display depends on whether the lines above or below are short or long, as shown in the following examples.

A short line above:

$$x^2 + y^2 = z^2$$

and a short line below.

A long line above may depend on your margins

$$\sin^2 \theta + \cos^2 \theta = 1$$

as will a long line below. This line is long enough to illustrate the spacing for mathematical displays, regardless of the margins.

1.2 Mathematics in Section Heads $\int_{\alpha}^{\beta} \ln t \, dt$

Mathematics can appear in section heads. Note that mathematics in section heads may cause difficulties in typesetting styles with running headers or table of contents entries.

1.3 Theorems, Lemmata, and Other Theorem-like Environments

A number of theorem-like environments is available. The following lemma is a well-known fact on differentiation of asymptotic expansions of analytic functions.

Lemma 1 *Let $f(z)$ be an analytic function in $\mathbb{C}_+$. If $f(z)$ admits the representation*

$$f(z) = a_0 + \frac{a_1}{z} + o\left(\frac{1}{z}\right),$$

for $z \to \infty$ inside a cone $\Gamma_\varepsilon = \{z \in \mathbb{C}_+ : 0 < \varepsilon \le \arg z \le \pi - \varepsilon\}$ then

$$a_1 = -\lim z^2 f'(z), \, z \to \infty, \, z \in \Gamma_\varepsilon. \tag{2}$$

Change z for $1/z$. Then $\Gamma_\varepsilon \to \overline{\Gamma}_\varepsilon = \{z \in \mathbb{C}_- : \overline{z} \in \Gamma_\varepsilon\}$ and

$$f(1/z) = a_0 + a_1 z + o(z). \tag{3}$$

Fix $z \in \overline{\Gamma}_\varepsilon$, and let $C_r(z) = \{\lambda \in \mathbb{C}_- : |\lambda - z| = r\}$ be a circle with radius $r = |z| \sin \varepsilon / 2$. It follows from (3) that

$$\frac{1}{2\pi i} \int_{C_r(z)} \frac{f(\lambda) \, d\lambda}{(\lambda - z)^2} = \sum_{m=0}^{1} a_m \frac{1}{2\pi i} \int_{C_r(z)} \frac{(\lambda - z_0)^m \, d\lambda}{(\lambda - z)^2} + R(z), \tag{4}$$

where for the remainder $R(z)$ we have

$$
\begin{aligned}
|R(z)| &\le r^{-1} \max_{\lambda \in C_r(z)} o(|z|) = r^{-1} \max_{\lambda \in C_r(z)} |\lambda| \cdot O(|z| + r) \\
&= \frac{|z| + r}{r} \cdot O(|z| + r) = \frac{1 + \sin \varepsilon}{\sin \varepsilon} \cdot O(|z|).
\end{aligned}
$$

Therefore $R(z) \to 0$ as $z \to \infty$, $z \in \overline{\Gamma}_{\varepsilon/2}$, and hence by the Cauchy theorem (4) implies

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[1]   LaTeX automatically selects the spacing depending on the surrounding line lengths.

$$\frac{d}{dz} f\left(1/z\right) = a_1 + R(z) \to a_1, \text{ as } z \to \infty, z \in \overline{\Gamma}_{\varepsilon/2},$$

that implies (2) by substituting $1/z$ back for z.

2 Section Headings

Use the Section tag for major sections, and the Subsection tag for subsections.

2.1 Subsection

This is some harmless text under a subsection.

2.1.1 Subsubsection

This is some harmless text under a subsubsection.

2.2 Tags

You can apply the logical markup tag *Emphasized*.

You can apply the visual markup tags **Bold**, *Italics*, Roman, Sans Serif, *Slanted*, SMALL CAPS, and Typewriter.

You can apply the special, mathematics only, tags 𝔣𝔯𝔞𝔨𝔱𝔲𝔯, 𝔹𝕃𝔸ℂ𝕂𝔹𝕆𝔸ℝ𝔻 𝔹𝕆𝕃𝔻, and 𝒞𝒜ℒℒℐ𝒢ℛ𝒜𝒫ℋℐ𝒞. Note that blackboard bold and calligraphic are correct only when applied to uppercase letters A through Z.

You can apply the size tags tiny, scriptsize, footnotesize, small, normalsize, large, Large, LARGE, huge and Huge.

This is a Body Math paragraph. Each time you press the Enter key, Scientific WorkPlace switches to mathematics mode. This is convenient for carrying out "scratchpad" computations. Following is a group of paragraphs marked as Body Quote. This environment is appropriate for a short quotation or a sequence of short quotations.

The only thing we have to fear is fear itself. *Franklin D. Roosevelt,* Mar. 4, 1933
Ask not what your country can do for you; ask what you can do for your country. *John F. Kennedy,* Jan. 20. 1961
There is nothing wrong with America that cannot be cured by what is right with America. *William J. "Bill" Clinton,* Jan. 21, 1993

2.3 List Environments

You can create numbered, bulleted, and description lists using the tag popup at the bottom left of the screen.

1. List item 1

2. List item 2
   (a) A list item under a list item.
       The typeset style for this level is different than the screen style. The screen shows a lower case alphabetic character followed by a period while the typeset style uses a lower case alphabetic character surrounded by parentheses.

   (b) Just another list item under a list item.
       (i) Third level list item under a list item.
           (A) Fourth and final level of list items allowed.

- Bullet item 1

- Bullet item 2
  - Second level bullet item.
    - Third level bullet item.
      - Fourth (and final) level bullet item.

Descrip. List   Each description list item has a term followed by the description of that term. Double click the term box to enter the term, or to change it.

Bunyip   Mythical beast of Australian Aboriginal legends.

[1] N. Dunford and J. Schwartz, *Functional Analysis*, v. 2, John Wiley and Sons, New York, 1963.

[2] Harstad, K. and Bellan, J., "Isolated fluid oxygen drop behavior in fluid hydrogen at rocket chamber pressures", *Int. J. Heat Mass Transfer*, 1998a, **41**, 3537-3550

[3] Harstad, K. and Bellan, J., "The Lewis number under supercritical conditions", *Int. J. Heat Mass Transfer,* in print

[4] Hirshfelder, J. O., Curtis, C. F. and Bird, R. B., *Molecular Theory of Gases and Liquids*, John Wiley and Sons, Inc., 1964

[5] Prausnitz, J., Lichtenthaler, R. and de Azevedo, E., Molecular thermodynamics for fluid-phase equilibrium, Prentice-Hall, Inc., 1986

[6] Reid, R. C., Prausnitz, J. M. and Polling, B. E., The Properties of Gases and Liquids, 4th Edition, McGraw-Hill Book Company, 1987