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This is an Example of an Article Title for Biometrics

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SUMMARY: This is the abstract.
KEY WORDS: `biom.cls`; Class files; LaTeX; Sample text;

1. Sample Mathematics and Text

This short sample document illustrates the typeset appearance of in-line and displayed mathematics in documents. It also illustrates five levels of section headings and three kinds of lists. Finally, the document includes entries for a manual bibliography and an appendix.

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 **?**.

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

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 $\Gamma_\varepsilon = \{z \in \mathbb{C}_+ : 0 < \varepsilon \leqslant \arg z \leqslant \pi - \varepsilon\}$ then

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

Proof. 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

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

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

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

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

2. Section Headings

Use the Section tag for major sections, such as the one just above. Four additional heading levels are available, as described below.

2.1 *Subsection Heading*

This text appears under a subsection heading.

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3. Lists

Bullet, numbered and description list environments are available. Lists, which can extend four levels deep, look like this:

(1) Numbered list item 1.

(2) Numbered list item 2.

    (a) A numbered list item under a list item.

        The typeset appearance for this level is often different from the screen appearance.

        The typeset appearance often uses parentheses around the level indicator.

    (b) Another numbered list item under a list item.

        (1) Third level numbered list item under a list item.

            (A) Fourth and final level of numbered list items allowed.

- Bullet item 1.
- Bullet item 2.
  - Second level bullet item.

· Third level bullet item.

* Fourth and final level bullet item.

Description List Each description list item has a lead-in followed by the item. Double-click the lead-in box to enter or customize the text of the lead-in.

Bunyip Mythical beast of Australian Aboriginal legends.

Acknowledgements

This optional (unnumbered) acknowledgements section may be included to thank or acknowledge the contributions of specific individuals who are not named as authors on the paper, or to cite a grant that supported the research being reported in the article.

Supplementary Material

This optional unnumbered section can be used to contain additional supplementary material that is relevant to the article. Following is a sample bibliography using BibTeX. Only one reference will be included since there is only one citation in this document in the appendix that follows.

References

Campbell, J. G., Fraley, C., Murtagh, F., and Raftery, A. E. (1997). Linear flaw detection in woven textiles using model-based clustering. *Pattern Recognition Letters* **18,** 1539–1548.

Appendix

Computation of $E_i\{\alpha_i\}$

(This appendix was not part of the original paper and is included here just for illustrative purposes. With only one appendix, a section heading that contains only a required space is used. For multiple appendices, the appendix title would be used for each section. The references are not relevant to the text of the appendix, they are references from the bibliography used to illustrate text before and after citations.) Here is an equation; note how it is numbered:

$$A = B + C. \tag{A.1}$$

Equation (A.1) is an the only numbered equation in this appendix. Spectroscopic observations of bright quasars show that the mean number density of Lyα forest lines, which satisfy certain criteria, evolves like $\mathrm{d}N/\mathrm{d}z = A(1+z)^\gamma$, where A and γ are two constants. Given the above intrinsic line distribution we examine the probability of finding large gaps in the Lyα forests. We concentrate here only on the statistics and neglect all observational complications such as the line blending effect (Campbell et al., 1997). We concentrate here only on the statistics and neglect all observational complications such as the line blending effect (Campbell et al., 1997). We concentrate here only on the statistics and neglect all observational complications such as the line blending effect (Campbell et al., 1997). The references are not relevant to the text of the appendix, they are references from the bibliography used to illustrate text before and after citations.) Spectroscopic observations of bright quasars show that the mean number density of Lyα forest lines, which satisfy certain criteria, evolves like $\mathrm{d}N/\mathrm{d}z = A(1+z)^\gamma$, where A and γ are two constants. Given the above intrinsic line distribution we examine the probability of finding large gaps in the Lyα forests. We concentrate here only on the statistics and neglect all observational complications such as the line blending effect (Campbell et al., 1997). We concentrate here only on the statistics and neglect all observational complications such as the line blending effect (Campbell et al., 1997). We concentrate here only on the statistics and neglect all observational complications such as the line blending effect (Campbell et al., 1997). Suppose we have observed a Lyα forest between redshifts z_1 and z_2 and found $N-1$ lines. For high-redshift quasars z_2 is usually the emission redshift $z_{\rm em}$ and z_1 is set to $(\lambda_{{\rm Ly}\beta}/\lambda_{{\rm Ly}\alpha})(1+z_{\rm em}) = 0.844(1+z_{\rm em})$ to avoid contamination by Lyβ lines. We want to know whether the largest gaps observed in the forest are significantly inconsistent with the above line distribution. To do this we introduce a new variable x:

$$x = \frac{(1+z)^{\gamma+1} - (1+z_1)^{\gamma+1}}{(1+z_2)^{\gamma+1} - (1+z_1)^{\gamma+1}}.$$

x varies from 0 to 1. We then have ${\rm d}N/{\rm d}x = \lambda$, where λ is the mean number of lines between z_1 and z_2 and is given by

$$\lambda \equiv \frac{A[(1+z_2)^{\gamma+1} - (1+z_1)^{\gamma+1}]}{\gamma+1}.$$

This means that the Lyα forest lines are uniformly distributed in x.