

An Example Article*

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Abstract. This is an example SIAM L^AT_EX article. This can be used as a template for new articles. Abstracts must be able to stand alone and so cannot contain citations to the paper's references, equations, etc. An abstract must consist of a single paragraph and be concise. Because of online formatting, abstracts must appear as plain as possible. Any equations should be inline.

Key words. example, L^AT_EX

AMS subject classifications. 68Q25, 68R10, 68U05

1. Introduction. The introduction introduces the context and summarizes the manuscript. It is importantly to clearly state the contributions of this piece of work. The next two paragraphs are text filler, generated by the `lipsum` package.

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The paper is organized as follows. Our main results are in [section 2](#), our new algorithm is in [section 3](#), experimental results are in [section 4](#), and the conclusions follow in [section 6](#).

2. Main results. We interleave text filler with some example theorems and theorem-like items.

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*Submitted to the editors DATE.

Funding: This work was funded by the Fog Research Institute under contract no. FRI-454.

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36 quis tortor vitae risus porta vehicula.

37 Here we state our main result as [Theorem 2.1](#); the proof is deferred to [section SM2](#).

38 [Theorem 2.1 \(\$LDL^T\$ Factorization \[1\]\)](#). *If $A \in \mathbb{R}^{n \times n}$ is symmetric and the principal
39 submatrix $A(1 : k, 1 : k)$ is nonsingular for $k = 1 : n - 1$, then there exists a unit lower
40 triangular matrix L and a diagonal matrix*

$$41 \quad D = \text{diag}(d_1, \dots, d_n)$$

42 *such that $A = LDL^T$. The factorization is unique.*

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48 ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas
49 vel, odio.

50 [Theorem 2.2 \(Mean Value Theorem\)](#). *Suppose f is a function that is continuous on the
51 closed interval $[a, b]$. and differentiable on the open interval (a, b) . Then there exists a number
52 c such that $a < c < b$ and*

$$53 \quad f'(c) = \frac{f(b) - f(a)}{b - a}.$$

54 *In other words,*

$$55 \quad f(b) - f(a) = f'(c)(b - a).$$

56 Observe that [Theorems 2.1](#) and [2.2](#) and [Corollary 2.3](#) correctly mix references to multiple
57 labels.

58 [Corollary 2.3](#). *Let $f(x)$ be continuous and differentiable everywhere. If $f(x)$ has at least
59 two roots, then $f'(x)$ must have at least one root.*

60 *Proof.* Let a and b be two distinct roots of f . By [Theorem 2.2](#), there exists a number c
61 such that

$$62 \quad f'(c) = \frac{f(b) - f(a)}{b - a} = \frac{0 - 0}{b - a} = 0. \quad \blacksquare$$

63 Note that it may require two L^AT_EX compilations for the proof marks to show.

64 Display matrices can be rendered using environments from `amsmath`:

$$65 \quad (2.1) \quad S = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \quad \text{and} \quad C = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}.$$

66 Equation [\(2.1\)](#) shows some example matrices.

67 We calculate the Fréchet derivative of F as follows:

$$68 \quad (2.2a) \quad F'(U, V)(H, K) = \langle R(U, V), H\Sigma V^T + U\Sigma K^T - P(H\Sigma V^T + U\Sigma K^T) \rangle$$

$$69 \quad \quad \quad = \langle R(U, V), H\Sigma V^T + U\Sigma K^T \rangle$$

$$70 \quad (2.2b) \quad \quad \quad = \langle R(U, V)V\Sigma^T, H \rangle + \langle \Sigma^T U^T R(U, V), K^T \rangle.$$

72 Equation (2.2a) is the first line, and (2.2b) is the last line.

73 **3. Algorithm.** Sed gravida lectus ut purus. Morbi laoreet magna. Pellentesque eu wisi.
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82 Our analysis leads to the algorithm in Algorithm 3.1.

Algorithm 3.1 Build tree

Define $P := T := \{\{1\}, \dots, \{d\}\}$

while $\#P > 1$ **do**

 Choose $C' \in \mathcal{C}_p(P)$ with $C' := \operatorname{argmin}_{C \in \mathcal{C}_p(P)} \varrho(C)$

 Find an optimal partition tree $T_{C'}$

 Update $P := (P \setminus C') \cup \{\bigcup_{t \in C'} t\}$

 Update $T := T \cup \{\bigcup_{t \in \tau} t : \tau \in T_{C'} \setminus \mathcal{L}(T_{C'})\}$

end while

return T

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91 **4. Experimental results.** Quisque facilisis auctor sapien. Pellentesque gravida hendrerit
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 97 pendisse arcu.

98 **Figure 1** shows some example results. Additional results are available in the supplement
 99 in **Table SM1**.

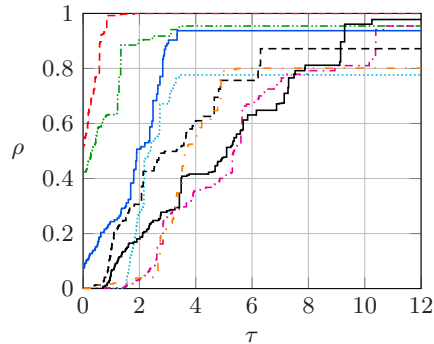


Figure 1. Example figure using external image files.

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107 **5. Discussion of $Z = X \cup Y$.** Curabitur nunc magna, posuere eget, venenatis eu, vehicula
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117 **6. Conclusions.** Some conclusions here.

118 **Appendix A. An example appendix.** Aenean tincidunt laoreet dui. Vestibulum ante
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 126 Curabitur vehicula odio vel dolor.

127 **Lemma A.1.** *Test Lemma.*

128 **Acknowledgments.** We would like to acknowledge the assistance of volunteers in putting
129 together this example manuscript and supplement.

130

REFERENCES

131 [1] G. H. GOLUB AND C. F. VAN LOAN, *Matrix Computations*, The Johns Hopkins University Press, Baltimore,
132 4th ed., 2013.