Proceedings of the ASME 2025
International Mechanical Engineering Congress and Exposition
IMECE2025
November 16–20, 2025, Memphis, TN

IMECE2025-XXXX

A LATEX TEMPLATE FOR ASME CONFERENCE PAPERS: `asmeconf.cls`

Luis Hernández[†]
Institution or Company Name
City, State

Maria Silva[†]
Institution or Company Name
City, Province, Canada

Henry Tudor, Catherine Parr[*]
Hampton Court Palace
Richmond, England

Jinsoo Kim
Institution or Company Name
City, State

Yusuf Yilmaz
Institution or Company Name
City, State

Amelia Smith
Institution or Company Name
City, State

Aadhya Acharya
Institution or Company Name
City, State

Omar Abu Bakr
Institution or Company Name
City, State

John H. Lienhard[*]
Massachusetts Institute of Technology
Cambridge, MA

ABSTRACT

This paper is an example of and a LaTeX *template for typesetting ASME conference papers using the* `asmeconf` *class. This* LaTeX *template follows ASME guidelines for margins, fonts, headings, captions, and reference formats as of 2025. The class should be used with the* `asmeconf.bst` BibTeX *style for reference formatting, which is part of this distribution. The template produces pdfs that contain hyperlinks, bookmarks, and metadata; and references can include the DOI and URL fields. Links may be colored, for online use, or black, for publication. The class enables inline author names, following ASME's current style, but can also produce the traditional grid style. Options include line numbering, final column balancing, various math options, government copyright, and archivability (PDF/A). In addition, section headers may contain mathematics, references, citations, and footnotes. The class is compatible with* pdfTeX *or* LuaLaTeX.

Keywords: ASME conference paper, LaTeX Template, BibTeX

NOMENCLATURE

Roman letters

k	Thermal conductivity [W m^{-1} K^{-1}]
$\vec{q}$	Heat flux vector [W m^{-2}]

Greek letters

α	Thermal diffusivity [m^2 s^{-1}]
ν	Kinematic viscosity [m^2 s^{-1}]

Dimensionless groups

Pr	Prandtl number, ν/α
Sc	Schmidt number, $\nu/\mathcal{D}_{1,2}$

Superscripts and subscripts

b	bulk value
∞	free stream value

1 INTRODUCTION

The `asmeconf` class typesets papers with margins, fonts, headings, captions, and reference formats that follow the specifications for conference papers of the American Society of Mechanical Engineers (ASME). The `asmeconf` class will set internal and external hyperlinks, and the pdf file will contain bookmarks and metadata. Many other useful features have been incorporated. This class is not a publication of ASME, but the author has published in ASME conferences since 1983.

The `.tex` file may be written using standard LaTeX commands, although some class-specific initial commands are needed to format the blocks containing the author[s], title, and abstract. This class loads a number of other packages, all of which are contained in up-to-date versions of TeX Live, MacTeX, and similar platforms. If you get an error message about a missing package, you can download that package at no cost from CTAN (ctan.org).

1.1 Essential Initial Commands

To begin, fill in the fields to be completed at top of the `asmeconf-template.tex` file. These fields include the headers for your conference and your paper number. The metadata you

[†]Joint first authors
[*]Corresponding author: lienhard@mit.edu, kate@thepalace.gov
Documentation for `asmeconf.cls`: Version 1.47, October 31, 2026.

Copyright ©2026 by ASME

provide will be placed into the pdf file itself. The title should be placed into `\title{..}`.

Put author names into the `\SetAuthors{name, name,...}` command in the desired order; follow the syntax illustrated `asmeconf-template.tex` file. Put each distinct address sequentially into a separate `\SetAffiliation{n}{address}`, where $n = 1, 2, \ldots$ Tag each author with an affiliation by putting `\affil{n}` after that author's name inside the `\SetAuthors{..` command.

Keep author addresses short. List the author institution, and the City, State (US authors), City, Province, Canada (Canadian authors), or City, Country (other international authors).

One author (or more) may be designated as the corresponding author by placing `\CorrespondingAuthor{email}` after `\affil{n}`. Two or more authors may be joint first authors by putting `\JointFirstAuthor` after `\affil{n}`.

After setting up the headers, authors, and title, issue the `\maketitle` command.

The abstract text must be placed into `\begin{abstract}` ... `\end{abstract}`. The abstract will automatically be italicized. Keywords may be included using the `\keywords{..}` command. The `keyword` command *must* be issued before the abstract environment.

2 REFERRING TO CITATIONS, FIGURES, AND EQUATIONS

Citations are automatically numbered [1]. They should be inserted in the text using a `\cite{ref}` command [2, 3]. The citations will be automatically sorted and compressed if they are given in a set [1–6]. A specific reference may be named with an abbreviation, as in Ref. [6]. See the `asmeconf-sample.bib` file and Sect. 5 for examples of entering references.

For ASME conference papers, the labels Equation and Figure should be abbreviated when they do not start a sentence, as in Eq. (3) and Fig. 1. Figure 1 is spelled out when it starts a sentence. Equation (3) is spelled out when it starts a sentence.

Equations are typeset in the usual way and will be automatically numbered. The class file loads the `amsmath` and `mathtools` packages. Further, the `newtxmath` package used for the math fonts includes many additional math features (see Sect. 6).

$$\vec{q} = -k\nabla T \tag{1}$$

ASME prefers SI units. (U.S. style units may follow in parentheses.) Be sure to put all symbols into the nomenclature list, including their units.

3 SECTION HEADINGS AND CAPTIONS

ASME requires that section headings and captions be set in an uppercase, sans serif font. The class will do this automatically. You can place `\cite{..}`, `\ref{..}`, `\label{..}`, and mathematics into headings and captions directly, as you would in the main text. Do not enclose them braces, e.g. `{\cite{..}}`, which will cause errors. You can place `\footnote{..}` into headings, but not into captions.[1,2]

[1] See `tex-stackexchange` for various approaches to footnotes in captions, if they seem necessary. For footnotes in tables, use the `tablefootnote` package.

[2] Sequential footnotes are automatically separated by a comma.

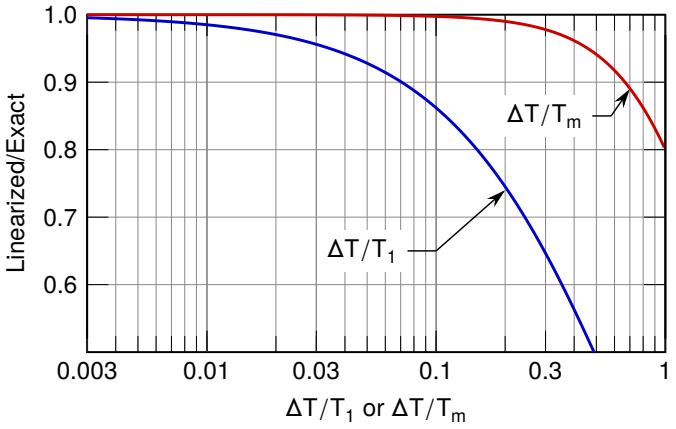


FIGURE 1: Caption with math, eqn. (1): $\Delta T/T_m$ vs. $\Delta T/T_1$ [7]

TABLE 1: A simple table

Experiment	u [m/s]	T [°C]
Run 11	12.5	103.4
Run 12	24	68.3

Text in section headings and captions will not be capitalized if enclosed in a `\NoCaseChange{..}` command.

Sections may either be numbered or left unnumbered.

Simple mathematical expressions can be used in either captions or section headings. For a section heading that includes more complicated math (and macros), you may use the optional argument of `\section[..]{..}` to create a pdf bookmark without losing characters or producing warnings or errors. See the `asmeconf-template.tex` source file for examples of this procedure. These bookmarks should usually be text expressions, although some math is supported.

To eliminate boldface type in caption text and math, use the class option `[unboldcaption]`. To prevent sans-serif math, put `\NoCaseChange{\mathversion{normal}}` in the caption.

3.1 Subsection and Sub-subsection Headings

Subsections and sub-subsection headings should be entered in title case, with the first letter of primary words capitalized. Sub-subsections (i.e., paragraphs) are never numbered.

4 TABLES AND FIGURES

Table 1 is an example of a simple table. Table captions should be placed above tables. The class loads the `booktabs` package (used for horizontal rules in Tables 1 and 2), and the `array` and `dcolumn` packages which provide extended capabilities for columns in the `tabular` environment (see Table 2). Table 3 is an example of a table that spans two columns. Two column tables (and figures) will always float to the top of a later page.

Figure captions go below figures. Figure 2 is an example of a figure that spans two columns and includes subfigures. The text in figures (and tables) should be no smaller than 6 point type. Images in figures are handled by the standard `graphicx` package.

Copyright ©2026 by ASME

TABLE 2: Table with more complicated columns

Experiment	u [m/s]	T [°C]
The first test we ran this morning	124.3	68,3
The second test we ran this morning	82.50	103,46
Our competitor's test	72.321	141,384

Landscape figures and tables may be produced at full-page size by putting `\usepackage[figuresright]{rotating}` in your `.tex` file's preamble and using the `sidewaystable*` and `sidewaysfigure*` environments [8].

5 REFERENCE FORMATTING WITH `asmeconf.bst`[3]

The `asmeconf.bst` BibTEX style follows the reference styles shown on ASME's conference web site in 2025.[4] Examples for these and many other cases are given in the `asmeconf-sample.bib` file, which is part of this distribution. Citations and references are managed by the standard `natbib` package. Nevertheless, a few comments are necessary.

DOI, URL, and eprint Include DOI numbers when they are available. URL's may alternatively be given. ASME requests that URLs point to a document's abstract.

Basic support for `eprint` numbers is also included, generating a url at the end of the citation. The `archive` type may be specified using the macros `arxiv, googlebooks, hdl, jstore, oclc,` or `pubmed` (e.g., `archive=hdl`, *without* braces). Both `eprint` and `archive` fields *must* be given. Other root urls may be invoked using `archive = {https://another.url.org/}`.

Online Sources A bibliography entry `@online{..` is included for citation of online sources, such as web pages. A `url` or `eprint` with `archive` must be included. See the examples of use in the `asmeconf-sample.bib` file.

Date Accessed The `urldate={..}` field may be used to provide the date on which a given url was accessed. By default, the text printed will be `Accessed 'date',`. The word "Accessed" may be changed using the `urltype={..}` field.

Conference Location and Date To specify the city and date of a conference, you can use `venue={..}` and `eventdate={..}` with the entries `@inproceeedings{..` and `@proceeedings{..`

Capitalization of Titles ASME's bibliography style requires that document titles be in title case. The first letters of principal words are capitalized. Do this in the `.bib` file.

6 MORE ON MATH: $\vec{u} \cdot \vec{\omega} = 0$

In most cases, the need for a wide equation can be eliminated by using one of the multiline equation environments defined by `amsmath`, such as `align`, `split`, or `multline` [10]. The following equation is set with the `multline` environment:

$$\frac{\partial}{\partial t}\left[\rho(e + |\vec{u}|^2/2)\right] + \nabla \cdot \left[\rho(h + |\vec{u}|^2/2)\vec{u}\right] = -\nabla \cdot \vec{q} + \rho\vec{u} \cdot \vec{g} + \frac{\partial}{\partial x_j}(d_{ji}u_i) + \dot{Q}_v \quad (2)$$

An example using `align` appears in Appendix A.

An experimental package for setting equations that span two columns, `asmewide.sty`, can be loaded as well, but that code may require hand-fitting around figures, tables, and page breaks. See the examples in [11]. An alternative solution may be to set large equations into two-column-wide tables or figures.

Math italics are used for Roman and Greek letters by default. If you want an upright letter in math, you can use the relevant math alphabet, e.g., `\mathrm, \mathbf, \mathsf`:

$$\vec{F} = m\vec{a} \quad \text{or} \quad \vec{\mathrm{F}} = m\vec{\mathrm{a}} \quad \text{or} \quad \mathbf{F} = m\mathbf{a} \quad \text{or} \quad \vec{\mathsf{F}} = m\vec{\mathsf{a}} \quad (3)$$

6.1 The `newtxmath` and `unicode-math` Packages [12, 13]

The `newtxmath` package, loaded by default with pdfTEX, includes many options for mathematics, most of which can be called as options to `\documentclass`. For example, the `upint` option selects upright integral signs (rather than slanted integral signs):

```
\documentclass[upint]{asmeconf}.
```

The option `subscriptcorrection` improves the spacing of math subscripts. Math options are discussed further in the `asmeconf-template.tex` file. The `newtxmath` package is also loaded with the `[nofontspec]` option.

To get additional symbols in bold math with pdfTEX, use `\bm{..}` from the `bm` package, which is loaded by the class.

If using LualaTEX, the math features of `unicode-math` are available. These include commands to select a boldface, upright symbol, `\symbfup{..}` or `\mathbfup{..}`, to select boldface fraktur symbol, `\symbffrak{..}` or `\mathbffrak{..}`, and so on. See the documentation of `unicode-math` for details [13].

The `[upint]` option also works under LualaTEX.

For longer passages of bold math, you can use `{\mathversion{bold}..}` with either pdfTEX or LualaTEX: `{\mathversion{bold} $A\otimes\mathfrak{F}$ }` gives $\boldsymbol{A} \otimes \mathfrak{F}$. Note that the math version must be changed *before* starting math mode.

6.2 Sans-Serif Greek Letters

The class file also provides upright sans-serif Greek letters with `\sfalpha` and similar expressions (e.g., $\mathsf{\alpha}, \mathsf{\beta}, \mathsf{\gamma}, \mathsf{\delta}$ ...), in case they are needed.

Under pdfTEX boldface, upright, sans-serif Greek letters can be obtained with `\bm{\sfalpha}`, etc. The `newtx` package also includes options that affect whether Greek letters are upright or slanted (see that package's documentation for details).

Under LualaTEX, boldface, sans-serif, upright Greek can be obtained with `\sfbfalpha`, etc., or by using `\symbfsfup{\alpha}`. In the first case, the glyphs are

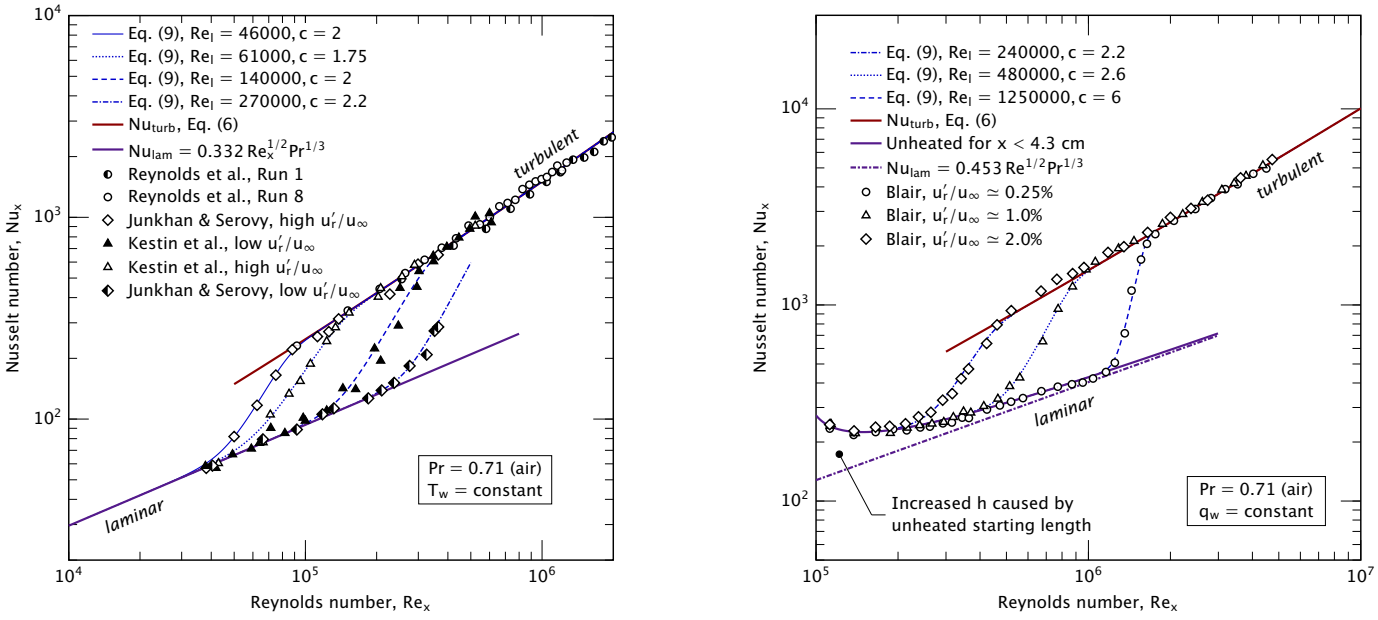
[3] To prevent capitalization of text in a section heading or caption, such as an SI unit, enclose it in a `\NoCaseChange` command. As of the July 2022 release of LaTeX, commands used in a heading or caption may be protected globally by putting this in the preamble: `\AddToNoCaseChangeList{\MyCommand}`

[4] `asmeconf.bst` is intended as a replacement for the old `asmems4.bst`, which does not follow ASME's current reference formats or support DOI and URL.

Copyright ©2026 by ASME

TABLE 3: A table spanning two columns

x	erf(x)	erfc(x)	x	erf(x)	erfc(x)
0.00	0.00000	1.00000	1.10	0.88021	0.11980
0.05	0.05637	0.94363	1.20	0.91031	0.08969
0.10	0.11246	0.88754	1.30	0.93401	0.06599
0.15	0.16800	0.83200	1.40	0.95229	0.04771
0.20	0.22270	0.77730	1.50	0.96611	0.03389
0.30	0.32863	0.67137	1.60	0.97635	0.02365
0.40	0.42839	0.57161	1.70	0.98379	0.01621
0.50	0.52050	0.47950	1.80	0.98909	0.01091
0.60	0.60386	0.39614	1.8214	0.99000	0.01000
0.70	0.67780	0.32220	1.90	0.99279	0.00721
0.80	0.74210	0.25790	2.00	0.99532	0.00468
0.90	0.79691	0.20309	2.50	0.99959	0.00041
1.00	0.84270	0.15730	3.00	0.99998	0.00002



(a) Uniform temperature wall

(b) Uniform heat flux wall with unheated starting length

FIGURE 2: A figure with two subfigures [9]

Copyright ©2026 by ASME

drawn from the Lete Sans Math font, while in the second case, the glyphs are from the TeX Gyre Termes Math font. Why are two different fonts being used? Unicode does not include medium-weight, upright, sans-serif Greek as a component of a serif font (like Termes), although it does include both upright and italic boldface Greek. However, in a sans-serif font (like Lete), Greek letters are sans-serif by default, including medium weight. (You can also invoke `\symbfsfit{\alpha}` for boldface, sans-serif, slanted type.)

Sans-serif Math Versions Two additional math versions, `sansbold` and `sans` are available in `asmeconf`. The former is used by default in captions and section headings. The latter is available in case you find a use for it. In LuaLaTeX, both versions use the Lete Sans Math fonts. In pdfTeX, the glyphs are from the `newtxsf` package.

6.3 Controlling Calligraphic, Script, Fraktur, or BB Fonts

With pdfTeX, the `[mathalpha]` package may be loaded in the preamble [14].[5] This package supports variety of font for calligraphic, fraktur, script, and blackboard bold fonts. For example,

```
\usepackage[cal=euler,frak=boondox]{mathalpha}
```

selects the Euler font for `\mathcal` and the Boondox font for `\mathfrak`. Refer to the `mathalpha` documentation for details [14]. The `[nofontspec]` option also supports `mathalpha`.

Under LuaLaTeX, the `unicode-math` `range` function can be used to select such fonts [13]. For example, the following code in the preamble would select the Euler Math font for calligraphic, script, fraktur, and blackboard bold fonts:

```
\setmathfont{Euler-Math}[
 range={cal,scr,frak,bb},
 Extension=.otf,Scale=MatchUppercase]
```

7 ADDITIONAL OPTIONS FOR `asmeconf.cls`

The class accepts a number of options in addition to those already described. These options are discussed next.

7.1 Colored Hyperlinks

ASME requires that all text be **in black** when the paper is submitted for publication. For other uses, authors may obtain colored hyperlinks with the `[colorlinks]` option.

7.2 Final Column Balancing

The option `[balance]` invokes the the `flushend` package [15]. This package will attempt to give equal height to the two columns on the last page. The performance of this package is sometimes inconsistent (with odd page layout or, very rarely, errors), so use this option with caution.

[5] As of v1.41, the `[mathalfa]` class option has been dropped.

7.3 Grid-Style Author Block

The option `[grid]` invokes ASME's grid-style arrangement of author names. In the `\SetAuthors{..}` command, individual author's names are recognized by the commas that separate them. (To include a comma *in* a name, enclose the name in braces.) Line breaks (`\\`) may be inserted into the address of `\SetAffiliation{n}{address}` as needed.

Note that ASME interprets the author order in the grid style by reading names from left-to-right in the top row, then left-to-right in each subsequent row.

7.4 Line Numbers

The option `[lineno]` invokes the the `lineno` package [16]. This option will produce line numbers in the margins. You must run LaTeX *twice* for proper placement of the numbers. Tables, captions, and footnotes will not be numbered. Line numbers can be helpful for review and editing, but should not be used in your final manuscript. See the documentation of the `lineno` package for further commands to control line numbering.

The `lineno` package is not compatible with the `flushend` package that makes final short columns the same height. Balancing is automatically disabled when this option is called.

7.5 Changing the Copyright Footer

The option `[nofoot]` will omit the ASME copyright from the page footer. The option `[govt]` will produce a copyright notice for authors who are employees of the U. S. Government. The option `[contractor]` will produce a copyright notice for authors who are employed by a U. S. Government contractor. The option `[somegovt]` gives a copyright notice for the case when only some authors are employees of the U. S. Government.

The footers are generated with the `fancyhdr` package [17] and can be changed using the commands of that package. Only the default arrangement matches ASME's style, however.

In addition, the conference header on the title page can be omitted using the option `[nohead]`.

7.6 Archivability: PDF/A

In June 2022, the LaTeX3 team added support for PDF/A to the LaTeX kernel through the command `\DocumentMetadata{..}`. This approach works with *both* pdfTeX and LuaLaTeX. Note that accessible conformance (`a` or `UA-2` level, a.k.a. "well-tagged PDF") is still under development by the LaTeX3 team.

As of `asmeconf` v1.41, the legacy options `[pdf-a]`, `[pdfa-part=]`, and `[pdfaconformance=]` have been dropped.

7.7 Typewriter Font Options

This font is the sans-serif `inconsolata`. By default, the word spacing is variable, but option `[mono]` switches to monospacing. A slashed zero is the default; option `[var0]` removes the slash. Option `[hyphenate]` enables hyphenation. (The hyphenation option is not available under LuaLaTeX with `fontspec`.)

7.8 Support for Other Languages

This package can be adapted to incorporate (or entirely use) languages other than English. See Appendix C for details.

Copyright ©2026 by ASME

8 NOMENCLATURE ENVIRONMENT

A nomenclature environment is included, as illustrated just after the abstract. Each item in the nomenclature list is entered as `\entry{symbol}{meaning}`. Optional subheadings can be included as well: `\EntryHeading{Roman letters}`. The environment includes an optional argument for changing the space between symbols and definitions, `\begin{nomenclature}[Xcm]`, where X is a number and cm can be replaced by any LaTeX dimensional unit: pt, in, ex, em, pc, etc. The default value is 2 em.

The title of the nomenclature can be also changed, e.g. `\renewcommand*{\nomname}{List of Symbols}`

9 CONCLUSION

Provide a brief conclusion (3 to 4 lines).

ACKNOWLEDGMENTS

Place any acknowledgments here.

REFERENCES

[1] Ning, Xiang and Lovell, Mary Rose. "On the Sliding Friction Characteristics of Unidirectional Continuous FRP Deposits." *ASME Journal of Tribology* Vol. 48 No. 5 (2002): pp. 2000–2008. DOI 10.1115/1.4042912.

[2] Gibson, Tom A. and Tucker, Matthew A. *The Big Book of Cellular Studies*. John Wiley and Sons, New York (2008).

[3] Stevens, Thomas T. "Stochastic Fields and Their Digital Simulation." *Stochastic Methods*. Martimius Publishers, Dordrecht (1999): pp. 22–36.

[4] Wions, Thomas and Mills, Christopher D. "Structural Dynamics in Parallel Manipulation." *Proceedings of the ASME IDETC/CIE*. DETC2005-99532: pp. 777–798. New Orleans, LA, September 10–13, 2005. DOI 10.1115/1.4042912. URL https://doi.org/10.1115/1.4042912.

[5] Smith, Robert. "Conformal Lubricated Contact of Cylindrical Surfaces Involved in a Non-Steady Motion." Ph.D. Thesis, Rochester Institute of Technology, Rochester, NY. 2002. DOI 10.1115/1.4042912. URL https://doi.org/10.1115/1.4042912.

[6] Watson, David. "Evaporative Heat Transfer in the Contact Line of a Mixture." Technical Report No. HTL-26, CFD-4. Iowa State University, Ames, IA. 1982. DOI 10.1115/1.4042912. URL https://doi.org/10.1115/1.4042912.

[7] Lienhard, John H. "Linearization of Nongray Radiation Exchange: The Internal Fractional Function Reconsidered." *ASME J. Heat Transfer* Vol. 141 No. 5 (2019): 052701. DOI 10.1115/1.4042158.

[8] Fairbairns, Robin, Rahtz, Sebastian and Barroca, Leonor. "A Package for Rotated Objects in LaTeX." Version 2.16d. Comprehensive TeX Archive Network (2016). Accessed October 2, 2019, URL https://www.ctan.org/pkg/rotating.

[9] Lienhard, John H. "Heat Transfer in Flat-Plate Boundary Layers: A Correlation for Laminar, Transitional, and Turbulent Flow." *ASME J. Heat Transfer* Vol. 142 No. 6 (2020): 061805. DOI 10.1115/1.4046795.

[10] American Mathematical Society and LaTeX3 Project. "User's Guide for the amsmath Package." Version 2.17t. Comprehensive TeX Archive Network (2024). Accessed March 14, 2025, URL https://ctan.org/tex-archive/macros/latex/required/amsmath/amsldoc.pdf.

[11] Lienhard, John H. "Wide Equations in `asmeconf.cls`." Version 1.11. Comprehensive TeX Archive Network (2025). Accessed March 16, 2025, URL https://www.ctan.org/pkg/asmeconf.

[12] Sharpe, Michael. "New TX Font Package." Version 1.640. Comprehensive TeX Archive Network (2020). Accessed January 4, 2021, URL https://ctan.org/pkg/newtx.

[13] Robertson, Will. "Experimental Unicode mathematical typesetting: The unicode-math package." Version 0.8r. Comprehensive TeX Archive Network (2023). Accessed March 9, 2025, URL https://ctan.org/pkg/unicode-math.

[14] Sharpe, Michael. "The mathalpha, AKA mathalfa Package." Version 1.145. Comprehensive TeX Archive Network (2025). Accessed March 9, 2025, URL https://ctan.org/pkg/mathalpha.

[15] Tolušis, Sigitas. "The flushend Package." Version 4.0. Comprehensive TeX Archive Network (2021). Accessed March 14, 2025, URL https://www.ctan.org/pkg/flushend.

[16] Böttcher, Stephan I., Lück, Uwe and Wette, Karl. "lineno.sty: A LaTeX Package to Attach Line Numbers to Paragraphs." Version 5.4. Comprehensive TeX Archive Network (2025). Accessed March 14, 2025, URL https://www.ctan.org/pkg/lineno.

[17] van Oostrum, Piet. "The fancyhdr and extramarks Packages." Version 5.2. Comprehensive TeX Archive Network (2025). Accessed March 14, 2025, URL https://www.ctan.org/pkg/fancyhdr.

[18] Smith, Robert. "Conformal Lubricated Contact of Cylindrical Surfaces Involved in a Steady Motion." Master's Thesis, Rochester Institute of Technology, Rochester, NY. 1998.

[19] Smith, Robert. "Cylindrical Surfaces Involved in a Steady Motion." BS Thesis, Rochester Institute of Technology, Rochester, NY. 1996.

[20] Reynolds, William C., Kays, William M. and Kline, Stephen J. "Heat Transfer in the Incompressible Turbulent Boundary Layer. I–Constant Wall Temperature." Memorandum 12-1-58W. NASA, Washington, DC. 1958. URL https://hdl.handle.net/2060/19980228020.

[21] Edwards, Donald K. "Thermal Radiation Measurements." Eckert, Ernst R. G. and Goldstein, Richard J. (eds.). *Measurement Techniques in Heat Transfer*. Vol. 130 of *AGARDograph*. Technivision Services, Slough, England (1970): Chap. 9, pp. 353–396. Published by the Advisory Group for Aerospace Research and Development of NATO.

[22] Bezos, Javier and Braams, Johannes L. "`babel`: Localization and internationalization." Version 25.25. Comprehensive TeX Archive Network (2025). Accessed March 14, 2025, URL https://ctan.org/pkg/babel.

[23] Lienhard, John H. "Example of LuaLaTeX with `asmeconf.cls` for ODE integration." Version 1.02. Comprehensive TeX Archive Network (2025). Accessed March 16, 2025, URL https://www.ctan.org/pkg/asmeconf.

Copyright ©2026 by ASME

[24] Lienhard, John H. "Language Support in asmeconf: non-latin alphabets, LuaLaTeX, and fontspec." Version 1.2. Comprehensive TeX Archive Network (2025). Accessed March 16, 2025, URL https://www.ctan.org/pkg/asmeconf.

[25] Pohlhausen, E. "Der Wärmeaustausch zwischen festen Körpern und Flüssigkeiten mit kleiner reibung und kleiner Wärmeleitung." *Zeitschrift für Angewandte Mathematik und Mechanik* Vol. 1 No. 2 (1921): pp. 115–121. DOI 10.1002/zamm.19210010205.

[26] Fourier, Jean Baptiste Joseph. *Théorie Analytique de la Chaleur*. Firmin Didot, Père et Fils, Paris (1822). URL https://books.google.com/books?id=1TUVAAAAQAAJ.

[27] Johnson, Howard (ed.). *Title of Edited Book*. John Wiley and Sons, Inc., New York, NY (1980).

[28] Yankovich, Al and Stern, Howard (eds.). *The Title of the Proceedings*, Vol. 15. Boston, MA, April 27–28. Organization (2015). URL http://web.mit.edu. Optional note.

[29] Govindan, Prakash Narayan, Lam, Steven and St. John, Maximus G. "Systems Including a Condensing Apparatus Such As a Bubble Column Condenser." US Patent #9700811 (2017). URL https://patents.google.com/patent/US9700811B2.

[30] Fong, Chamberlain. "Analytical Methods for Squaring the Disc." *ArXiv e-prints* (2015). URL https://arxiv.org/abs/1509.06344.

[31] Galassi, Mark, Davies, Jim, Theiler, James, Gough, Brian, Jungman, Gerard, Alken, Patrick, Booth, Michael, Rossi, Fabrice and Ulerich, Rhys. *GNU Scientific Library*, Release 2.7. Free Software Foundation, Boston, MA (2021). URL https://www.gnu.org/software/gsl/.

[32] van der Walt, Stéfan and Smith, Nathaniel. "mpl colormaps." GitHub, San Francisco, CA (2015). Accessed August 26, 2018, URL http://bids.github.io/colormap/.

[33] Churchill, Winston S. *The Gathering Storm*, 1st ed. Houghton Mifflin Co., Boston (1948): Chap. 5, pp. 66–89. "The Locust Years".

[34] Kirk, James Tiberius. *Decline and Fall of the Romulan Empire*, 7th ed. Vol. 23 of *Humankind's Greatest Writings*. Vulcan Free Press, T'Paal (2288). URL http://web.mit.edu. To appear.

A THE VECTOR PRODUCT $\vec{A} \times \vec{B}$

This brief illustration of an appendix shows the numbering of the appendix and equations. Equations are numbered consecutively, following those in the paper. Consider $\rho \neq \mathrm{fn}(p)$:

$$\frac{d\Gamma}{dt} = \frac{d}{dt}\int_C \mathbf{u}\cdot d\mathbf{r} \tag{4}$$

$$= \int_C \frac{D\mathbf{u}}{Dt}\cdot d\mathbf{r} + \underbrace{\int_C \mathbf{u}\cdot d\left(\frac{d\mathbf{r}}{dt}\right)}_{=0} \tag{5}$$

$$= \iint_S \nabla\times\frac{D\mathbf{u}}{Dt}\cdot d\mathbf{A} \tag{6}$$

$$= \iint_S \nabla p\times\nabla\left(\frac{1}{\rho}\right)\cdot d\mathbf{A} \tag{7}$$

B USE WITH LuaLaTeX

The LuaLaTeX engine is useful with asmeconf in at least three situations:

Executing lua code directly in your LaTeX file. With lua code, complicated functions can be plotted or numerical integration can be executed. An example file in the distribution demonstrates this capability [23]. In this situation, you can use the class option [nofontspec] to stay with the newtx fonts. (This setting does not support for non-Latin alphabets.)

Using complex alphabets. With pdfTeX, asmeconf supports Latin alphabets, as well as Cyrillic, Greek, and Vietnamese. With LuaLaTeX with the fontspec package you can use non-Latin fonts available on your computer if you call the [loadscripts] option.[6,7] For Japanese in particular, use the class option [japanese]. See the example file in this distribution for more details [24].

Producing tagged PDF. Under LuaLaTeX with unicode-math (which loads by default), asmeconf PDF files can meet the PDF 2.0/UA-2 accessibility standard using appropriate arguments to \DocumentMetadata{..} provided that: a) subcaptions are not used; b) any figure files meet the standard; and c) language options are used cautiously (some languages are compatible with tagging, but others currently are not). As of the Nov. 2025 released of LaTeX, accessible PDF can be produced with the following settings:

```
\DocumentMetadata{
 pdfstandard = { ua-2 , a-4f },
 tagging = on }
```

Tagged PDF files can render accurately as HTML files (see ngpdf.com). Version 1.44 of asmeconf includes a CSS style sheet control web appearance, asmeconf-style.css.

For clarity, fontspec and unicode-math are automatically loaded when asmeconf is run under LuaLaTeX. Those packages require that the necessary fonts are available on your computer. If you wish to use LuaLaTeX without the features of unicode-math and fontspec, use the class option [nofontspec].

Over the long-term, LuaLaTeX will become the preferred engine for using LaTeX (see *LaTeX News*, Issue 40). Access to LuaLaTeX is different in each LaTeX platform. Check the documentation for your platform to load LuaLaTeX.

[6] For Latin scripts (including English) under LuaLaTeX, you *must* have these OpenType fonts (.otf) installed (all are in TeX Live and will be present if your installation is complete and up-to-date): TeX Gyre Termes X, TeX Gyre Termes Math, TeX Gyre Heros, Inconsolatazi4, LeteSansMath, STIX Two Math. For Greek and Russian, the Noto Serif, Sans, and Mono TrueType fonts (.ttf) are used, and other Noto fonts are used for south and east Asian scripts. The Noto fonts are **not** currently in TeX Live (go here: github.com/googlefonts/noto-fonts).

[7] The [loadscripts] option was added in v1.42 of asmeconf, in order to reduce compilation time when non-Latin scripts are not needed.

Copyright ©2026 by ASME

C MULTILINGUAL SUPPORT

ASME publishes in English, but the `babel` package is loaded for users who may wish to include other languages. For example, an author might wish to include an appendix that provides the abstract in another language.

When more than one language option is included in `\documentclass[..]{asmeconf}`, English will be set as the document's main language. (To choose a different main language, set `[main=..]`). If no language options are given, the package defaults to English. As examples, a passage in German is shown in Anhang D, followed by abstracts in other languages.

The input encoding can be utf-8, as for these glyphs: àáâäæãåā èéęëêēė îïíīįì ôöòóœøōõ ûüùúū çćč ł ñń ßśš ÿ žźż.

Fonts similar to Times/Helvetica are used when Greek, Vietnamese, or selected cyrillic-alphabet languages are called as options under pdfTEX. Using LuaLATEX, which loads the fontspec package, many additional scripts are available; see the supplemental notes for such usage [24]. Possibilities include Arabic, Bengali, Chinese, Devanagari (e.g., for Hindi), Hangul (for Korean), Kana (for Japanese), and Tamil. *These options require an up-to-date LATEX installation.*

The `asmeconf` class defines several switches that can be used to call languages only when certain class options have been called, as `\if...\fi`: `\ifScriptsLoaded`, `\ifFontspecLoaded`, `\ifpdftex`, and `\ifJapaneseLoaded`.

The bibliography style, `asmeconf.bst`, is designed in English and aimed at BibTEX.

D WÄRMEAUSTAUSCH UND REIBUNGSWIDERSTAND (von E. POHLHAUSEN)

In einer strömenden Flussigkeit sind Wärmeleitung und Wärmekonvektion Vorgänge, die mit der inneren Reibung (oder Impulsleitung) und mit der Impulskonvektion große Aehnlichkeit besitzen. Mathematisch findet dies seinen Ausdruck in dem gleichartigen Bau der Differentialgleichungen, die einerseits für die Temperatur und anderseits für den Geschwindigkeitsvektor in der Flüssigkeit bestehen. Man kann daraus auf eine Beziehung zwischen dem Wärmeaustanch und dem Reibungswiderstand schließen, die eine strömende Flüssigkeit an einem festen Körper hervorrufen. Dies ist zuerst von Prandtl ausgesprochen und durchgeführt worden, und zwar für turbulente Vorgänge, unter der vereinfachenden Annahme von Wärmequellen und -senken im Innern der Flüssigkeit [25].

Copyright ©2026 by ASME