[[1]](#footnote-1)

Simulação de possível melhora de mobilidade e redução de custo ao construir uma ponte entre Itajaí e Navegantes próxima ao ferry boat

Adson Marques da Silva Esteves, Alisson Steffens Henrique e Augusto Pluschkat

*Abstract*—These instructions give you guidelines for preparing papers for IEEE Transactions and Journals*.* Use this document as a template if you are using Microsoft *Word* 6.0 or later. Otherwise, use this document as an instruction set. The electronic file of your paper will be formatted further at IEEE. Paper titles should be written in uppercase and lowercase letters, not all uppercase. Avoid writing long formulas with subscripts in the title; short formulas that identify the elements are fine (e.g., "Nd–Fe–B"). Do not write “(Invited)” in the title. Full names of authors are preferred in the author field, but are not required. Put a space between authors’ initials. Define all symbols used in the abstract. Do not cite references in the abstract. Do not delete the blank line immediately above the abstract; it sets the footnote at the bottom of this column.

*Index Terms*—Enter key words or phrases in alphabetical order, separated by commas. For a list of suggested keywords, send a blank e-mail to [keywords@ieee.org](mailto:keywords@ieee.org) or visit <http://www.ieee.org/organizations/pubs/ani_prod/keywrd98.txt>

# Introdução

C

OM o aumento do número de automóveis na cidade de Itajaí dada pela situação de habitantes estarem comprando automóveis próprios, turistas utilizarem o aeroporto em Navegantes e habitantes de Navegantes virem trabalhar em Itajaí, certos pontos da cidade tendem a apresentar lentidão durante horários de pico, principalmente entre as rotas que conectam as cidades de Itajaí e Navegantes.

Duas rotas principais são utilizadas nessa travessia: a via pela BR-101 e BR-470; e a via pela Avenida Santos Dumont. O primeiro trajeto percorre uma distância de 24 Km, enquanto no segundo trajeto a distância é de apenas 2,7 Km, contando com uma balsa intermediária, que atravessa o Rio Itajaí-Açu, cuja travessia é cobrada a quantia de R$ 8,75 para clientes com automôveis.

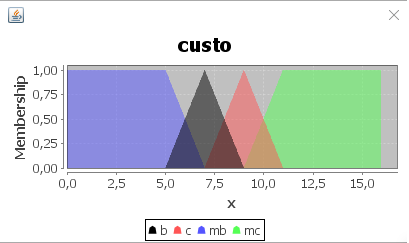


Fig. 1. Exemplo de gráfico gerado pela lógica Fuzzy. Eixo X graus de verdade, eixo Y variáveis, cores são as variáveis linguísticas. (REVER)

(PARÁGRAFO PARA JUSTIFICAR A MELHORIA DA CONEXÃO ENTRE AS CIDADES).

Este documento visa demonstrar os problemas relacionados à conexão entre as cidades, utilizando custo e eficiência das rotas existentes e comparando com outras cidades gêmeas.

# Método Escolhido

Foi definida a utilização do método da lógica Fuzzy (ou lógica difusa), pois os parâmetros de avaliação de custo e eficiência utilizadas no projeto produzem resultados qualitativos, sendo então possível realizar a transformação através desse método dos dados em resultados numéricos para analisá-los quantativamente. Com o uso da lógica Fuzzy será possível avaliar as rotas mais viáveis e compará-las com a situação existente no trajeto entre Itajaí e Navegantes..

## Definição de Lógica Fuzzy

A lógica Fuzzy aplica o conceito de que há exceções às regras definidas pela lógica booleana, ao qual visa diferenciar valores apenas entre 0 ou 1, verdadeiro ou falso. Para a lógica Fuzzy, dentro das duas possibilidades da lógica booleana podem ocorrer “graus de verdade”, ou seja, o quanto a variável é verdadeira a partir de valores reais entre 0 e 1.

Em 1965, a lógica Fuzzy foi proposta pelo Dr. Lofti A. Zadeh na Universidade da Califórnia, que trabalhava no projeto de possibilitar a um computador entender a linguagem natural, tendo o uso da lógica booleana acarretado em problemas pela dificulade em aplicar a dicotomia de verdadeira e falso para casos reais do cotidiano. (PROCURAR REFERÊNCIA)

Uma das principais características da lógica Fuzzy é a capacidade de quantificar dados qualitativos e expressões linguísticas, como por exemplo, não simplesmete definir uma pessoa como jovem ou idosa, mas através de transições entre os estados extremos, tais como criança, adolescente e meia-idade. O uso dessa lógica é possível de ser representado por um gráfico com as variáveis e seus níveis de verdade entre os dois extremos.

## Implementação da Lógica Fuzzy

Foi definido a utilização da biblioteca jFuzzyLogic, que é uma biblioteca *open source* em Java que implementa e simplifica a lógica Fuzzy para desenvolvimento de sistemas através da implementação da Fuzzy Control Language(FCL) especificação IEC 61131 parte 7. O motivo pelo uso dessa biblioteca se deu pelo fato do projeto ter sido desenvolvido em Java e tal bibloteca ter documentação ampla e de fácil acesso.

Foram definidas duas entradas como input: o “custo” e a “eficiência”.

(REFAZER EXPLICAÇÃO DAS VARIÁVEIS)

# Dados Utilizados

Nesta seção serão apresentados os dados utilizados e os métodos de escolha e captura dos dados utilizados na pesquisa.

## Locais Escolhidos

O primeiro local selecionado, e objeto de estudo do projeto, são os bairros Centro das cidades de Navegantes e Itajaí.

Para servirem de parâmetro de comparação com o caso de Itajaí e Navegantes, foram escolhidas cidades que tenham uma situação similar, ou seja, que se enquadram no termo “Cidades Gêmeas” e que possuem uma divisa fluvial entre as cidades.

Cidades Gêmeas é um termo utilizado para definir cidades geograficamente vizinhas que possuem um crescimento parecido e tendem a possuir uma grande movimentação entre ambas. Não existe um critério específico que defina quais cidades seriam gêmeas, mas dentro da lista das mais conhecidas muitas contêm uma divisão fluvial e pontes de ligação entre as cidades.

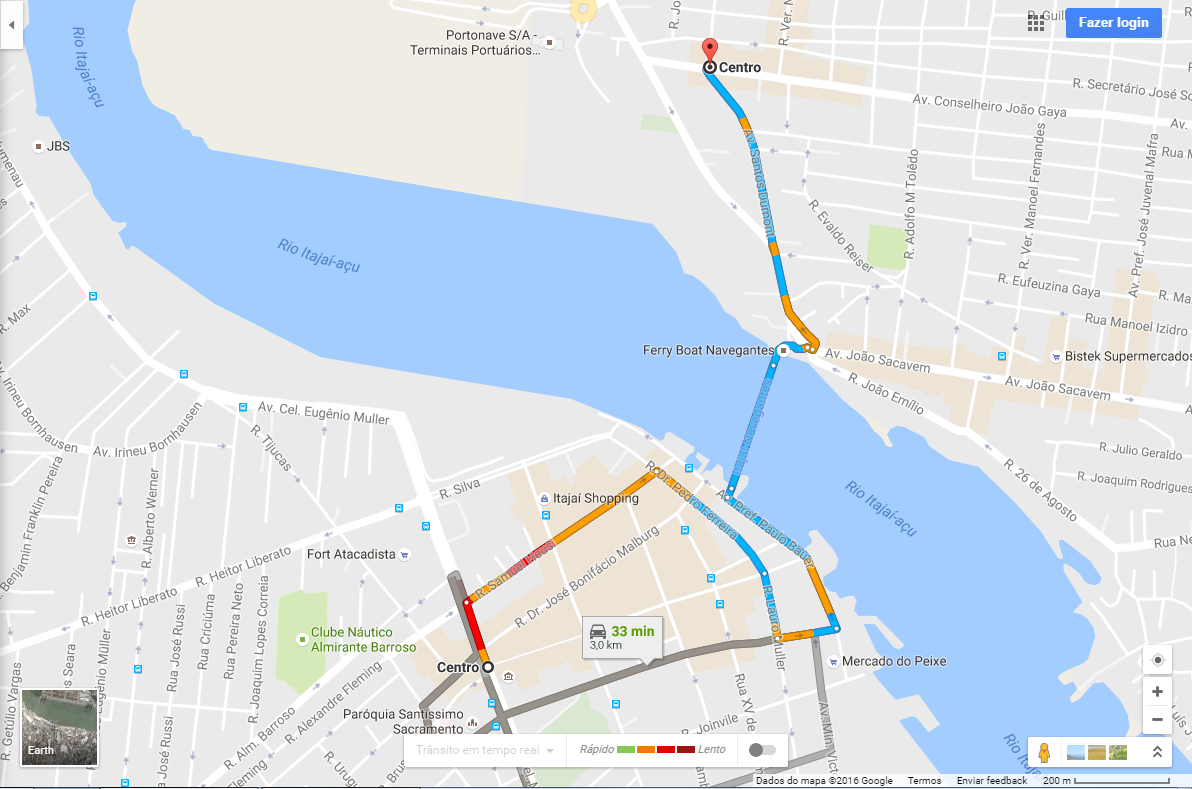


Fig. 2. Rota mais rápida gerada pelo googlemaps entre Navegantes e Itajaí

Levando em consideração essas características, foram definidos como pontos de comparação as cidades gêmeas de São José e Florianópolis, pela proximidade com a região de Itajaí; e as cidades de Boston e Cambridge, pela familiaridade de membros do projeto com o local e para ter um ponto de referência internacional.

## Método de Captura dos Dados de Trânsito

Os dados foram recolhidos a partir da ferramenta do Google chamada GoogleMaps.

A ferramenta permite verificar o trânsito de qualquer rota desejada em tempo real, como também verificar o trânsito típico durante a semana em um horário específico.

Decidiu-se não verificar o trânsito típico, mas sim escolher um horário específico, pois ao selecionar uma rota no googlemaps, os gráficos de transito atual se sobrepunham ao do transito típico, o que dificulta a determinação do dados do trajeto.

Uma vez escolhido o método, foi escolhido um dia e um horário em meio a semana para obter os dados que seriam utilizados no projeto. Buscou-se um horário em que as cidades estivessem em um horário de pico, ou seja, quando o trânsito estivesse mais lento do que normalmente, sendo portanto utilizado o horário das 18h, que é o horário que normalmente a maioria das pessoas vão de seus trabalhos para suas casas.

Inicialmente os dados das amostras foram coletados por volta das 18h do dia 30/11/2016, porém houve a necessidade de refazer a coleta nas 21h (18h no horário EST) do dia 02/12/2016 para Boston e Cambridge para corrigir os dados por causa do fuso horário diferente.

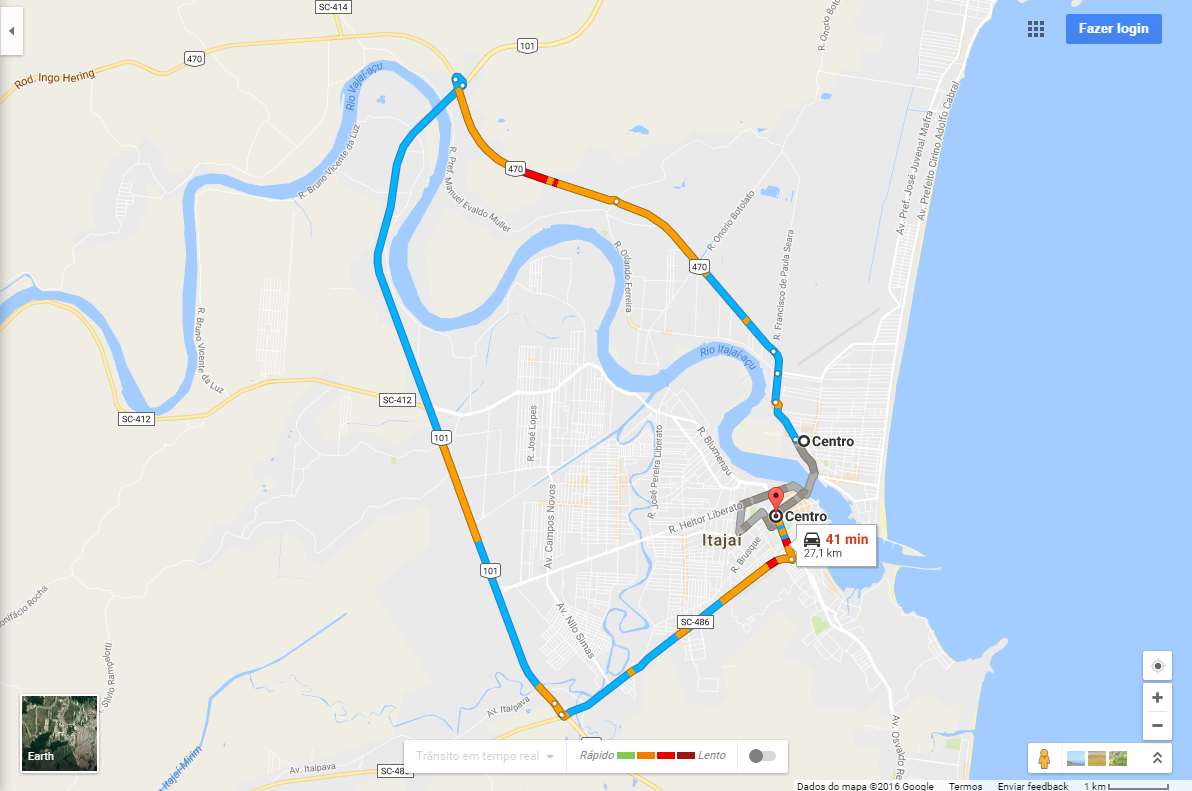


Fig. 3. Rota mais lenta gerada pelo googlemaps entre Navegantes e Itajaí

## Método de Seleção de Dados de Custo

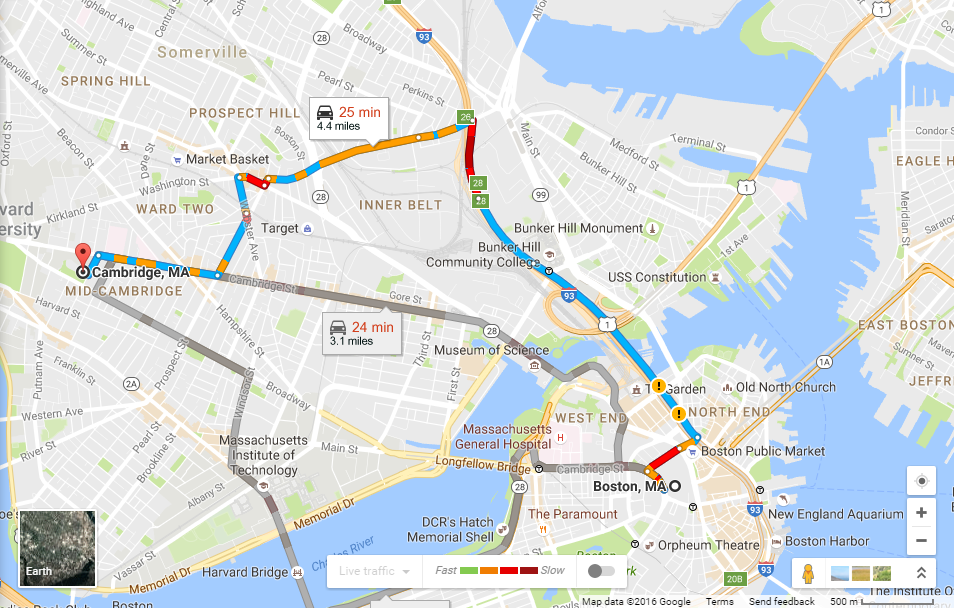


Fig. 7. Rota mais lenta gerada pelo googlemaps entre Cambridge e Boston

Para o cálculo de gasto médio das vias, foi utilizado como base o carro mais vendido de 2016 segundo o site da revista quatro rodas, o Chevrolet Onix. (LEMBRAR DAS REFERÊNCIAS)

Foi utilizada na simulação como parâmetro as especificações de consumo do modelo Chevrolet Onix 1.4 LT e LTZ, com câmbio automático de 6 velocidades. O custo de gasolina deste carro é de 11,7 km/l na cidade e 13,9 km/l na estrada.(REFERÊNCIA)

O preço da gasolina foi considerado como R$ 3,30 o litro, que é o preço atual da gasolina em Itajaí(REFERÊNCIA) Houve a necessidade de considerar no trajeto entre Itajai e Navagentos o custo de transporte da balsa, que é de R$ 8,75.(REFERÊNCIA)

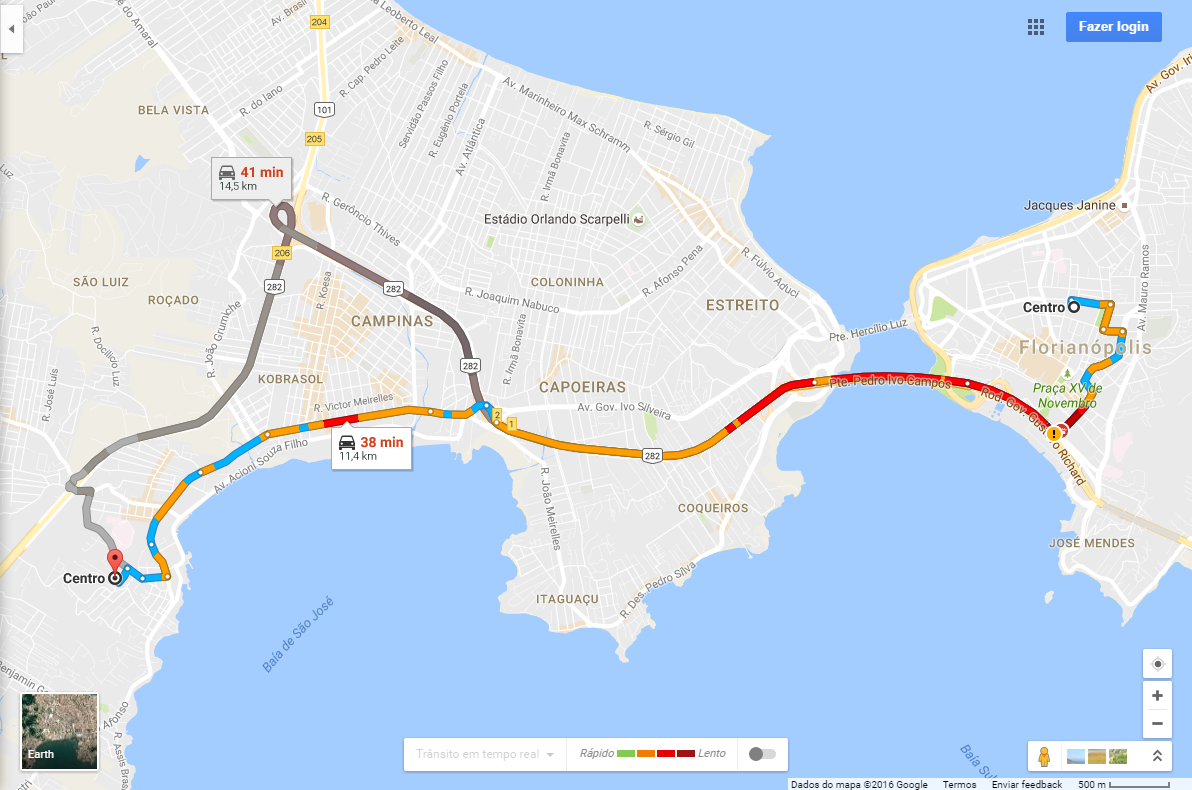


Fig. 4. Rota mais rápida gerada pelo googlemaps entre São José e Florianópolis

Os cálculos para descobrir os parâmetros de gasto, foram através de duas contas: aacompra dos litros com base no preço atual da cidade de Itajaí

**Consumo Itajaí – Navegantes por Ferry boat**

**Consumo Itajaí – Navegantes pela BR**

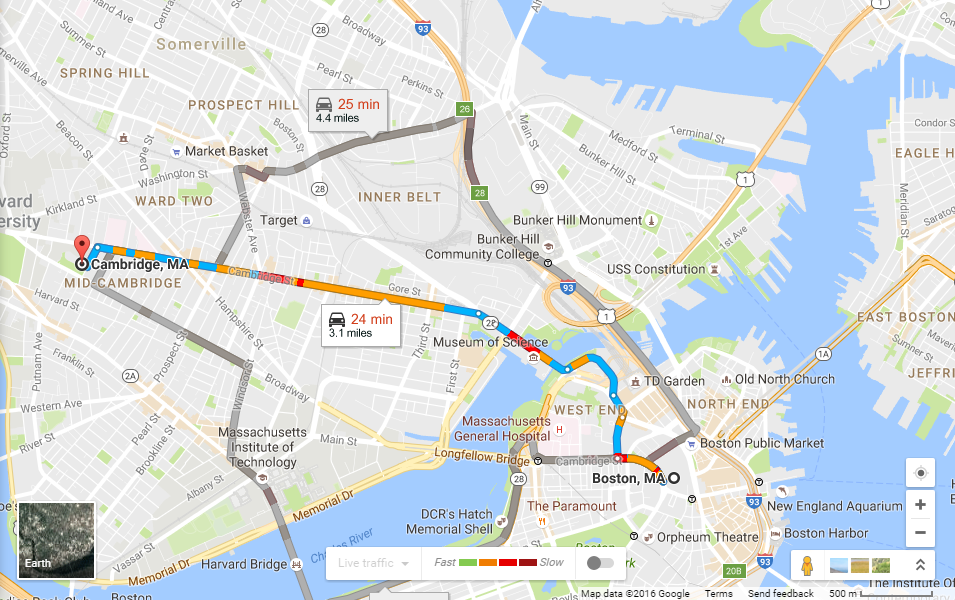


Fig. 6. Rota mais rápida gerada pelo googlemaps entre Cambridge e Boston

**Consumo São José – Florianópolis caminho lento**

**Consumo São José – Florianópolis caminho rápido**

**Consumo Boston – Cambridge caminho lento**

**Consumo Boston – Cambridge caminho rápido**

Portando, os dados finais de custo mais as tarifas de pedágio e/ou balsa das rotas entre as cidades escolhidas foram:

**Itajaí – Navegantes por Ferry boat:** 8,75+0,7 = R$ 9,45

**Itajaí – Navegantes pela BR:** R$ 7,66

**São José – Florianópolis caminho lento:** R$ 4,10

**São José – Florianópolis caminho rápido:** R$ 3,20

**Boston – Cambridge caminho lento:** R$ 2,01

**Boston – Cambridge caminho rápido:** R$ 1,42

# Resultados

Use either SI (MKS) or CGS as primary units. (SI units are strongly encouraged.) English units may be used as secondary units (in parentheses). This applies to papers in data storage**.** For example, write “15 Gb/cm2 (100 Gb/in2).” An exception is when English units are used as identifiers in trade, such as “3½-in disk drive.” Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity in an equation.

The SI unit for magnetic field strength *H* is A/m. However, if you wish to use units of T, either refer to magnetic flux density *B* or magnetic field strength symbolized as µ0*H*. Use the center dot to separate compound units, e.g., “A·m2.”

# Some Common Mistakes

The word “data” is plural, not singular. The subscript for the permeability of vacuum µ0 is zero, not a lowercase letter “o.” The term for residual magnetization is “remanence”; the adjective is “remanent”; do not write “remnance” or “remnant.” Use the word “micrometer” instead of “micron.” A graph within a graph is an “inset,” not an “insert.” The word “alternatively” is preferred to the word “alternately” (unless you really mean something that alternates). Use the word “whereas” instead of “while” (unless you are referring to simultaneous events). Do not use the word “essentially” to mean “approximately” or “effectively.” Do not use the word “issue” as a euphemism for “problem.” When compositions are not specified, separate chemical symbols by en-dashes; for example, “NiMn” indicates the intermetallic compound Ni0.5Mn0.5 whereas “Ni–Mn” indicates an alloy of some composition NixMn1-x.

Be aware of the different meanings of the homophones “affect” (usually a verb) and “effect” (usually a noun), “complement” and “compliment,” “discreet” and “discrete,” “principal” (e.g., “principal investigator”) and “principle” (e.g., “principle of measurement”). Do not confuse “imply” and “infer.”

Prefixes such as “non,” “sub,” “micro,” “multi,” and “ultra” are not independent words; they should be joined to the words they modify, usually without a hyphen. There is no period after the “et” in the Latin abbreviation “*et al.*” (it is also italicized). The abbreviation “i.e.,” means “that is,” and the abbreviation “e.g.,” means “for example” (these abbreviations are not italicized).

A general IEEE styleguide is available at <http://www.ieee.org/web/publications/authors/transjnl/index.html>

TABLE I

Units for Magnetic Properties

|  |  |  |
| --- | --- | --- |
| Symbol | Quantity | Conversion from Gaussian and  CGS EMU to SI a |
| Φ | magnetic flux | 1 Mx → 10−8 Wb = 10−8 V·s |
| *B* | magnetic flux density,  magnetic induction | 1 G → 10−4 T = 10−4 Wb/m2 |
| *H* | magnetic field strength | 1 Oe → 103/(4π) A/m |
| *m* | magnetic moment | 1 erg/G = 1 emu  → 10−3 A·m2 = 10−3 J/T |
| *M* | magnetization | 1 erg/(G·cm3) = 1 emu/cm3  → 103 A/m |
| 4π*M* | magnetization | 1 G → 103/(4π) A/m |
| σ | specific magnetization | 1 erg/(G·g) = 1 emu/g → 1 A·m2/kg |
| *j* | magnetic dipole  moment | 1 erg/G = 1 emu  → 4π × 10−10 Wb·m |
| *J* | magnetic polarization | 1 erg/(G·cm3) = 1 emu/cm3  → 4π × 10−4 T |
| χ*,* κ | susceptibility | 1 → 4π |
| χρ | mass susceptibility | 1 cm3/g → 4π × 10−3 m3/kg |
| μ | permeability | 1 → 4π × 10−7 H/m  = 4π × 10−7 Wb/(A·m) |
| μr | relative permeability | μ → μr |
| *w, W* | energy density | 1 erg/cm3 → 10−1 J/m3 |
| *N, D* | demagnetizing factor | 1 → 1/(4π) |

Vertical lines are optional in tables. Statements that serve as captions for the entire table do not need footnote letters.

aGaussian units are the same as cg emu for magnetostatics; Mx = maxwell, G = gauss, Oe = oersted; Wb = weber, V = volt, s = second, T = tesla, m = meter, A = ampere, J = joule, kg = kilogram, H = henry.

# Guidelines for Graphics Preparation and Submission

## Types of Graphics

The following list outlines the different types of graphics published in IEEE journals. They are categorized based on their construction, and use of color / shades of gray:

### *Color/Grayscale figures*

### Figures that are meant to appear in color, or shades of black/gray. Such figures may include photographs, illustrations, multicolor graphs, and flowcharts.

### *Lineart figures*

### Figures that are composed of only black lines and shapes. These figures should have no shades or half-tones of gray. Only black and white.

### *Author photos*

### Head and shoulders shots of authors which appear at the end of our papers.

### *Tables* Data charts which are typically black and white, but sometimes include color.

## Multipart figures

Figures compiled of more than one sub-figure presented side-by-side, or stacked. If a multipart figure is made up of multiple figure types (one part is lineart, and another is grayscale or color) the figure should meet the stricter guidelines.

## File Formats For Graphics

Format and save your graphics using a suitable graphics processing program that will allow you to create the images as PostScript (PS), Encapsulated PostScript (.EPS), Tagged Image File Format (.TIFF), Portable Document Format (.PDF), or Portable Network Graphics (.PNG) sizes them, and adjusts the resolution settings. If you created your source files in one of the following programs you will be able to submit the graphics without converting to a PS, EPS, TIFF, PDF, or PNG file: Microsoft Word, Microsoft PowerPoint, or Microsoft Excel. Though it is not required, it is recommended that these files be saved in PDF format rather than DOC, XLS, or PPT. Doing so will protect your figures from common font and arrow stroke issues that occur when working on the files across multiple platforms. When submitting your final paper, your graphics should all be submitted individually in one of these formats along with the manuscript.

## Sizing of Graphics

Most charts, graphs, and tables are one column wide (3.5 inches / 88 millimeters / 21 picas) or page wide (7.16 inches / 181 millimeters / 43 picas). The maximum depth a graphic can be is 8.5 inches (216 millimeters / 54 picas). When choosing the depth of a graphic, please allow space for a caption. Figures can be sized between column and page widths if the author chooses, however it is recommended that figures are not sized less than column width unless when necessary.

There is currently one publication with column measurements that don’t coincide with those listed above. Proceedings of the IEEE has a column measurement of 3.25 inches (82.5 millimeters / 19.5 picas).

The final printed size of author photographs is exactly   
1 inch wide by 1.25 inches tall (25.4 millimeters x 31.75 millimeters / 6 picas x 7.5 picas). Author photos printed in editorials measure 1.59 inches wide by 2 inches tall (40 millimeters x 50 millimeters / 9.5 picas x 12 picas).

## Resolution

The proper resolution of your figures will depend on the type of figure it is as defined in the “Types of Figures” section. Author photographs, color, and grayscale figures should be at least 300dpi. Lineart, including tables should be a minimum of 600dpi.

## Vector Art

While IEEE does accept, and even recommends that authors submit artwork in vector format, it is our policy is to rasterize all figures for publication. This is done in order to preserve the figures’ integrity across multiple computer platforms.

## Color Space

The term color space refers to the entire sum of colors that can be represented within the said medium. For our purposes, the three main color spaces are Grayscale, RGB (red/green/blue) and CMYK (cyan/magenta/yellow/black). RGB is generally used with on-screen graphics, whereas CMYK is used for printing purposes.

All color figures should be generated in RGB or CMYK color space. Grayscale images should be submitted in Grayscale color space. Line art may be provided in grayscale OR bitmap colorspace. Note that “bitmap colorspace” and “bitmap file format” are not the same thing. When bitmap color space is selected, .TIF/.TIFF is the recommended file format.

## Accepted Fonts Within Figures

When preparing your graphics IEEE suggests that you use of one of the following Open Type fonts: Times New Roman, Helvetica, Arial, Cambria, and Symbol. If you are supplying EPS, PS, or PDF files all fonts must be embedded. Some fonts may only be native to your operating system; without the fonts embedded, parts of the graphic may be distorted or missing.

A safe option when finalizing your figures is to strip out the fonts before you save the files, creating “outline” type. This converts fonts to artwork what will appear uniformly on any screen.

## Using Labels Within Figures

### Figure Axis labels

Figure axis labels are often a source of confusion. Use words rather than symbols. As an example, write the quantity “Magnetization,” or “Magnetization *M*,” not just “*M*.” Put units in parentheses. Do not label axes only with units. As in Fig. 1, for example, write “Magnetization (A/m)” or “Magnetization (Am−1),” not just “A/m.” Do not label axes with a ratio of quantities and units. For example, write “Temperature (K),” not “Temperature/K.”

Multipliers can be especially confusing. Write “Magnetization (kA/m)” or “Magnetization (103 A/m).” Do not write “Magnetization (A/m) × 1000” because the reader would not know whether the top axis label in Fig. 1 meant 16000 A/m or 0.016 A/m. Figure labels should be legible, approximately 8 to 10 point type.

### Subfigure Labels in Multipart Figures and Tables

Multipart figures should be combined and labeled before final submission. Labels should appear centered below each subfigure in 8 point Times New Roman font in the format of (a) (b) (c).

## File Naming

Figures (line artwork or photographs) should be named starting with the first 5 letters of the author’s last name. The next characters in the filename should be the number that represents the sequential location of this image in your article. For example, in author “Anderson’s” paper, the first three figures would be named ander1.tif, ander2.tif, and ander3.ps.

Tables should contain only the body of the table (not the caption) and should be named similarly to figures, except that ‘.t’ is inserted in-between the author’s name and the table number. For example, author Anderson’s first three tables would be named ander.t1.tif, ander.t2.ps, ander.t3.eps.

Author photographs should be named using the first five characters of the pictured author’s last name. For example, four author photographs for a paper may be named: oppen.ps, moshc.tif, chen.eps, and duran.pdf.

If two authors or more have the same last name, their first initial(s) can be substituted for the fifth, fourth, third... letters of their surname until the degree where there is differentiation. For example, two authors Michael and Monica Oppenheimer’s photos would be named oppmi.tif, and oppmo.eps.

## Referencing a Figure or Table Within Your Paper

When referencing your figures and tables within your paper, use the abbreviation “Fig.” even at the beginning of a sentence. Do not abbreviate “Table.” Tables should be numbered with Roman Numerals.

## Checking Your Figures: The IEEE Graphics Checker

The IEEE Graphics Checker Tool enables authors to pre-screen their graphics for compliance with IEEE Transactions and Journals standards before submission. The online tool, located at <http://graphicsqc.ieee.org/>, allows authors to upload their graphics in order to check that each file is the correct file format, resolution, size and colorspace; that no fonts are missing or corrupt; that figures are not compiled in layers or have transparency, and that they are named according to the IEEE Transactions and Journals naming convention. At the end of this automated process, authors are provided with a detailed report on each graphic within the web applet, as well as by email.

For more information on using the Graphics Checker Tool   
or any other graphics related topic, contact the IEEE Graphics Help Desk by e-mail at [graphics@ieee.org](mailto:graphics@ieee.org).

## Submitting Your Graphics

Because IEEE will do the final formatting of your paper,   
you do not need to position figures and tables at the top and bottom of each column. In fact, all figures, figure captions, and tables can be placed at the end of your paper. In addition to, or even in lieu of submitting figures within your final manuscript, figures should be submitted individually, separate from the manuscript in one of the file formats listed above in section VI-J. Place figure captions below the figures; place table titles above the tables. Please do not include captions as part of the figures, or put them in “text boxes” linked to the figures. Also, do not place borders around the outside of your figures.

## Color Processing / Printing in IEEE Journals

All IEEE Transactions, Journals, and Letters allow an author to publish color figures on IEEE *Xplore*® at no charge, and automatically convert them to grayscale for print versions. In most journals, figures and tables may alternatively be printed in color if an author chooses to do so. Please note that this service comes at an extra expense to the author. If you intend to have print color graphics, include a note with your final paper indicating which figures or tables you would like to be handled that way, and stating that you are willing to pay the additional fee.

# Conclusion

## A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

Appendix

Appendixes, if needed, appear before the acknowledgment.

Acknowledgment

The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments. Avoid expressions such as “One of us (S.B.A.) would like to thank ... .” Instead, write “F. A. Author thanks ... .” In most cases, sponsor and financial support acknowledgments are placed in the unnumbered footnote on the first page, not here.

References and Footnotes

## References

References need not be cited in text. When they are, number citations on the line, in square brackets inside the punctuation. Multiple references are each numbered with separate brackets. When citing a section in a book, please give the relevant page numbers. In text, refer simply to the reference number. Do not use “Ref.” or “reference” except at the beginning of a sentence: “Reference [3] shows ... .” Please do not use automatic endnotes in *Word*, rather, type the reference list at the end of the paper using the “References” style.

Reference numbers are set flush left and form a column of their own, hanging out beyond the body of the reference. The reference numbers are on the line, enclosed in square brackets. In all references, the given name of the author or editor is abbreviated to the initial only and precedes the last name. Use them all; use *et al*. only if names are not given. Use commas around Jr., Sr., and III in names. Abbreviate conference titles. When citing IEEE transactions, provide the issue number, page range, volume number, year, and/or month if available. When referencing a patent, provide the day and the month of issue, or application. References may not include all information; please obtain and include relevant information. Do not combine references. There must be only one reference with each number. If there is a URL included with the print reference, it can be included at the end of the reference.

Other than books, capitalize only the first word in a paper title, except for proper nouns and element symbols. For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation See the end of this document for formats and examples of common references. For a complete discussion of references and their formats, see “The IEEE Style Manual,” available as a PDF link off the *Author Digital Toolbox* main page.

## Footnotes

Number footnotes separately in superscripts (Insert | Footnote).[[2]](#footnote-2) Place the actual footnote at the bottom of the column in which it is cited; do not put footnotes in the reference list (endnotes). Use letters for table footnotes (see Table I).

# Submitting Your Paper for Review

## Review Stage Using Word 6.0 or Higher

If you want to submit your file with one column electronically, please do the following:

--First, click on the View menu and choose Print Layout.

--Second, place your cursor in the first paragraph. Go to the Format menu, choose Columns, choose one column Layout, and choose “apply to whole document” from the dropdown menu.

--Third, click and drag the right margin bar to just over 4 inches in width.

The graphics will stay in the “second” column, but you can drag them to the first column. Make the graphic wider to push out any text that may try to fill in next to the graphic.

## Final Stage Using Word 6.0

When you submit your final version (after your paper has been accepted), print it in two-column format, including figures and tables. You must also send your final manuscript on a disk, via e-mail, or through a Web manuscript submission system as directed by the society contact. You may use *Zip* for large files, or compress files using *Compress, Pkzip, Stuffit,* or *Gzip.*

Also, send a sheet of paper or PDF with complete contact information for all authors. Include full mailing addresses, telephone numbers, fax numbers, and e-mail addresses. This information will be used to send each author a complimentary copy of the journal in which the paper appears. In addition, designate one author as the “corresponding author.” This is the author to whom proofs of the paper will be sent. Proofs are sent to the corresponding author only.

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References

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2. USA: Abbrev. of Publisher, year, ch. *x*, sec. *x*, pp. *xxx–xxx.*

*Examples:*

1. G. O. Young, “Synthetic structure of industrial plastics,” in *Plastics,* 2nd ed., vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15–64.
2. W.-K. Chen, *Linear Networks and Systems.* Belmont, CA: Wadsworth, 1993, pp. 123–135.

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1. J. K. Author, “Name of paper,” *Abbrev. Title of Periodical*, vol. *x,* no. *x,* pp*. xxx-xxx,* Abbrev. Month, year.

*Examples:*

1. J. U. Duncombe, “Infrared navigation—Part I: An assessment   
   of feasibility,” *IEEE Trans. Electron Devices*, vol. ED-11, no. 1, pp. 34–39, Jan. 1959.
2. E. P. Wigner, “Theory of traveling-wave optical laser,” *Phys. Rev*.,   
   vol. 134, pp. A635–A646, Dec. 1965.
3. E. H. Miller, “A note on reflector arrays,” *IEEE Trans. Antennas Propagat*., to be published.

*Basic format for reports:*

1. J. K. Author, “Title of report,” Abbrev. Name of Co., City of Co., Abbrev. State, Rep. *xxx*, year.

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1. E. E. Reber, R. L. Michell, and C. J. Carter, “Oxygen absorption in the earth’s atmosphere,” Aerospace Corp., Los Angeles, CA, Tech. Rep. TR-0200 (4230-46)-3, Nov. 1988.
2. J. H. Davis and J. R. Cogdell, “Calibration program for the 16-foot antenna,” Elect. Eng. Res. Lab., Univ. Texas, Austin, Tech. Memo. NGL-006-69-3, Nov. 15, 1987.

*Basic format for handbooks:*

1. *Name of Manual/Handbook*, *x* ed., Abbrev. Name of Co., City of Co., Abbrev. State, year, pp. *xxx-xxx.*

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1. *Transmission Systems for Communications*, 3rd ed., Western Electric Co., Winston-Salem, NC, 1985, pp. 44–60.
2. *Motorola Semiconductor Data Manual*, Motorola Semiconductor Products Inc., Phoenix, AZ, 1989.

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   INET96 Annual Meeting. [Online]. Available: <http://home.process.com/Intranets/wp2.htp>

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*Basic format for patents (when available online):*

1. Name of the invention, by inventor’s name. (year, month day). *Patent Number* [Type of medium]. Available: site/path/file

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1. Musical toothbrush with adjustable neck and mirror, by L.M.R. Brooks. (1992, May 19). *Patent D 326 189*

[Online]. Available: NEXIS Library: LEXPAT File: DESIGN

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1. D. B. Payne and J. R. Stern, “Wavelength-switched pas- sively coupled single-mode optical network,” in *Proc. IOOC-ECOC,* 1985,   
   pp. 585–590.

*Example for papers presented at conferences (unpublished):*

1. D. Ebehard and E. Voges, “Digital single sideband detection for interferometric sensors,” presented at the 2nd Int. Conf. Optical Fiber Sensors, Stuttgart, Germany, Jan. 2-5, 1984.

*Basic format for patents:*

1. J. K. Author, “Title of patent,” U.S. Patent *x xxx xxx*, Abbrev. Month, day, year.

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1. G. Brandli and M. Dick, “Alternating current fed power supply,”   
   U.S. Patent 4 084 217, Nov. 4, 1978.

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*Examples:*

1. J. O. Williams, “Narrow-band analyzer,” Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993.
2. N. Kawasaki, “Parametric study of thermal and chemical nonequilibrium nozzle flow,” M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.

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1. A. Harrison, private communication, May 1995.
2. B. Smith, “An approach to graphs of linear forms,” unpublished.
3. A. Brahms, “Representation error for real numbers in binary computer arithmetic,” IEEE Computer Group Repository, Paper R-67-85.

*Basic format for standards:*

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1. IEEE Criteria for Class IE Electric Systems, IEEE Standard 308, 1969.
2. Letter Symbols for Quantities, ANSI Standard Y10.5-1968.

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Mr. Author’s awards and honors include the Frew Fellowship (Australian Academy of Science), the I. I. Rabi Prize (APS), the European Frequency and Time Forum Award, the Carl Zeiss Research Award, the William F. Meggers Award and the Adolph Lomb Medal (OSA).

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