IEEE Citation Reference

IEEE Publications uses *Webster's College Dictionary*, 4th Edition. For guidance on grammar and usage not included in this manual, please consult *The Chicago Manual of Style*, published by the University of Chicago Press.

Citiation standards in this reference are provided for:

Books

Basic Format:

[1] J. K. Author, "Title of chapter in the book," in *Title of His Published Book, x*th ed. City of Publisher, Country if not USA: Abbrev. of Publisher, year, ch. *x*, sec. *x*, pp. *xxx–xxx.*

NOTE: Use *et al.* when three or more names are given.

Examples:

[1] B. Klaus and P. Horn, *Robot Vision.* Cambridge, MA: MIT Press, 1986.

[2] L. Stein, "Random patterns," in *Computers and You*, J. S. Brake, Ed. New York: Wiley, 1994, pp. 55-70.

[3] R. L. Myer, "Parametric oscillators and nonlinear materials," in *Nonlinear Optics*, vol. 4, P. G. Harper and B. S. Wherret, Eds. San Francisco, CA: Academic, 1977, pp. 47-160.

[4] M. Abramowitz and I. A. Stegun, Eds., *Handbook of Mathematical Functions* (Applied Mathematics Series 55). Washington, DC: NBS, 1964, pp. 32-33.

[5] E. F. Moore, "Gedanken-experiments on sequential machines," in *Automata Studies* (Ann. of Mathematical Studies, no. 1), C. E. Shannon and J. McCarthy, Eds. Princeton, NJ: Princeton Univ. Press, 1965, pp. 129-153.

[6] Westinghouse Electric Corporation (Staff of Technology and Science, Aerospace Div.), *Integrated Electronic Systems*. Englewood Cliffs, NJ: Prentice-Hall, 1970.

[7] M. Gorkii, "Optimal design," *Dokl. Akad. Nauk SSSR*, vol. 12, pp. 111-122, 1961 (Transl.: in L. Pontryagin, Ed., *The Mathematical Theory of Optimal Processes.* New York: Interscience, 1962, ch. 2, sec. 3, pp. 127-135).

[8] G. O. Young, "Synthetic structure of industrial plastics," in *Plastics*, vol. 3, *Polymers of Hexadromicon*, J. Peters, Ed., 2nd ed. New York: McGraw-Hill, 1964, pp. 15-64.

Handbooks

Basic Format: [1] *Name of Manual/Handbook, x* ed., Abbrev. Name of Co., City of Co., Abbrev. State, year, pp. *xx-xx.*

Examples:

[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.

[3] *RCA Receiving Tube Manual*, Radio Corp. of America, Electronic Components and Devices, Harrison, NJ, Tech. Ser. RC-23, 1992.

TR-0200 (4230-46)-3, Nov. 1988.

Reports

The general form for citing technical reports is to place the name and location of the company or institution after the author and title and to give the report number and date at the end of the reference.

Basic Format:

[1] J. K. Author, "Title of report," Abbrev. Name of Co., City of Co., Abbrev. State, Rep. *xxx*, year.

Examples:

[1] E. E. Reber *et al*., "Oxygen absorption in the earth's atmosphere," Aerospace Corp., Los Angeles, CA, Tech. Rep. 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.
[3] R. E. Haskell and C. T. Case, "Transient signal propagation in lossless isotropic plasmas," USAF Cambridge Res. Labs., Cambridge, MA, Rep. ARCRL-66-234 (II), 1994, vol. 2.
[4] M. A. Brusberg and E. N. Clark, "Installation, operation, and data evaluation of an oblique-incidence ionosphere sounder system," in "Radio Propagation Characteristics of the Washington-Honolulu Path," Stanford Res. Inst., Stanford, CA, Contract NOBSR-87615, Final Rep., Feb. 1995, vol. 1.
[5] P. Diament and W. L. Lupatkin, "V-line surface-wave radiation and scanning," Dept. Elect. Eng., Columbia Univ., New York, Sci. Rep. 85, Aug. 1991.

Conference Technical Articles

The general form for citing technical articles published in conference proceedings is to list the author/s and title of the paper, followed by the name (and location, if given) of the conference publication *in italics* using these standard abbreviations.

When the word below appears in the conference publication title,	*abbreviate to*
Annals	Ann.
Annual	Annu.
Colloquium	Colloq.
Conference	Conf.
Congress	Congr.
Convention	Conv.
Digest	Dig.
Exposition	Expo.
International	Int.
National	Nat.

When the word below appears in the conference publication title,	*abbreviate to*
Proceedings	Proc.
Record	Rec.
Symposium	Symp.
Technical Digest	Tech. Dig.
Technical Paper	Tech. Paper
First	1st
Second	2nd
Third	3rd
Fourth/*n*th ...	4th/*n*th...

Write out all the remaining words, but omit most articles and prepositions like "of the" and "on." That is, *Proceedings of the 1996 Robotics and Automation Conference* becomes *Proc. 1996 Robotics and Automation Conf.*

Basic Format:

[1] J. K. Author, "Title of paper," in *Unabbreviated Name of Conf.*, City of Conf., Abbrev. State (if given), year, pp. *xxx-xxx.*

For an electronic conference article when there are no page numbers:

[1] J. K. Author [two authors: J. K. Author and A. N. Writer] [three or more authors: J. K. Author et al.], "Title of Article," in [Title of Conf. Record as it appears on the copyright page], [copyright year] © [IEEE or applicable copyright holder of the Conference Record]. doi: [DOI number]

For an unpublished papr presented at a conference:

[1] J. K. Author, "Title of paper," presented at the Unabbrev. Name of Conf., City of Conf., Abbrev. State, year.

Online Sources

The basic guideline for citing online sources is to follow the standard citation for the source given previously and add the Digital Object Identifier (DOI) at the end of the citation, or add the DOI in place of page numbers if the source is not paginated. The DOI for each IEEE conference article is assigned when the article is processed for inclusion in the IEEE Xplore digital library and is included with the reference data of the article in Xplore. See The DOI System for more information about the benefits of DOI referencing.

The following sources are unique in that they are electronic only sources.

FTP

Basic Format:

[1] J. K. Author. (year). *Title* (edition) [Type of medium]. Available FTP: Directory: File:

Example:

[1] R. J. Vidmar. (1994). *On the use of atmospheric plasmas as electromagnetic reflectors* [Online]. Available FTP: atmnext.usc.edu Directory: pub/etext/1994 File: atmosplasma.txt

WWW

Basic Format:

[1] J. K. Author. (year, month day). *Title* (edition) [Type of medium]. Available: http://www.(URL)

Example:

[1] J. Jones. (1991, May 10). *Networks (2nd ed.)* [Online]. Available: http://www.atm.com

E-Mail

Basic Format:

[1] J. K. Author. (year, month day). *Title* (edition) [Type of medium]. Available e-mail: Message:

Example:

[1] S. H. Gold. (1995, Oct. 10). *Inter-Network Talk* [Online]. Available e-mail: COMSERVE@RPIECS Message: Get NETWORK TALK

Telnet

Basic Format:

[1] J. K. Author. (year, month day). *Title* (edition) [Type of medium]. Available Telnet: Directory: File:

Example:

[1] V. Meligna. (1993, June 11). *Periodic table of elements* [Online]. Available Telnet: Library.CMU.edu Directory: Libraries/Reference Works File: Periodic Table of Elements

Patents, Standards, Theses, Unpublished

Patents

Basic Format:

[1] J. K. Author, "Title of patent," U.S. Patent *x xxx xxx*, Abbrev. Month, day, year.

Example:

[1] J. P. Wilkinson, "Nonlinear resonant circuit devices," U.S. Patent 3 624 125, July 16, 1990.

NOTE: Use "issued date" if several dates are given.

Standards

Basic Format:

[1] *Title of Standard*, Standard number, date.

Examples:

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

Theses (M.S.) and Dissertations (Ph.D.)

Basic Format:

[1] J. K. Author, "Title of thesis," M.S. thesis, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.
[2] J. K. Author, "Title of dissertation," Ph.D. dissertation, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.

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.
[3] N. M. Amer, "The effects of homogeneous magnetic fields on developments of tribolium confusum," Ph.D. dissertation, Radiation Lab., Univ. California, Berkeley, Tech. Rep. 16854, 1995. *** *The state abbreviation is omitted if the name of the university includes the state name, i.e., "Univ. California, Berkeley."****
[4] C. Becle, These de doctoral d'etat, Univ. Grenoble, Grenoble, France, 1968.

Unpublished

These are the two most common types of unpublished references.

Basic Format :

[1] J. K. Author, private communication, Abbrev. Month, year.
[2] J. K. Author, "Title of paper," unpublished.

Examples:

[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.

Periodicals

NOTE: When referencing IEEE Transactions, the issue number should be deleted and month carried.

Basic Format:

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

Examples:

[1] R. E. Kalman, "New results in linear filtering and prediction theory," *J. Basic Eng.*, ser. D, vol. 83, pp. 95-108, Mar. 1961.

[2] Ye. V. Lavrova, "Geographic distribution of ionospheric disturbances in the F2 layer," *Tr. IZMIRAN*, vol. 19, no. 29, pp. 31–43, 1961 (Transl.: E. R. Hope, Directorate of Scientific Information Services, Defence Research Board of Canada, Rep. T384R, Apr. 1963).

[3] E. P. Wigner, "On a modification of the Rayleigh–Schrodinger perturbation theory," (in German), *Math. Naturwiss. Anz. Ungar. Akad. Wiss.*, vol. 53, p. 475, 1935.

[4] E. H. Miller, "A note on reflector arrays," *IEEE Trans. Antennas Propag...*, to be published.**

[5] C. K. Kim, "Effect of gamma rays on plasma," submitted for publication. **

[6] W. Rafferty, "Ground antennas in NASA's deep space telecommunications," *Proc. IEEE* vol. 82, pp. 636-640, May 1994.

** *Always use this style when the paper has not yet been accepted or scheduled for publication. Do not use "to appear in."*

Abbreviations for IEEE Periodicals

Proceedings of the IEEE abbreviates to: Proc. IEEE
Proceedings of the IRE abbreviates to: Proc. IRE *(until 1962)*

IEEE Journals	IEEE J. Comput. Aid. Des.	IEEE J. Solid-State Circuits
	IEEE J. Ocean. Eng.	IEEE Sensors J.
	IEEE J. Quantum Electron.	IEEE Syst. J.
	IEEE J. Sel. Areas Commun.	IEEE Transl. J. Magn. Jpn.
	IEEE J. Sel. Topics Signal Process.	J. Lightw. Technol.
	IEEE J. Sel. Topics. Quantum Electron.	J. Microelectromech. Syst.
IEEE Letters	IEEE Antennas Wireless Propag. Lett.	IEEE Photonics Technol. Lett.
	IEEE Commun. Lett.	IEEE Power Electron. Lett. *(until 2005)*
	IEEE Electron Device Lett.	IEEE Signal Process. Lett.
IEEE Magazines	IEEE Aerosp. Electron. Syst. Mag.	IEEE Ind. Appl. Mag.
	IEEE Annals Hist. Comput.	IEEE Instrum. Meas. Mag.
	IEEE Antennas Propagat. Mag.	IEEE Intell. Syst.
	IEEE ASSP Mag. *(1984–1990)*	IEEE Internet Comput.
	IEEE Circuits Devices Mag. *(1985–present)*	IEEE IT Prof.
	IEEE Circuits Syst. Mag. *(1979–1984)*	IEEE Micro
	IEEE Commun. Mag. *(1979–present)*	IEEE Microwave
	IEEE Commun. Soc. Mag. *(until 1978)*	IEEE Multimedia
	IEEE Comput. Appl. Power	IEEE Nanotechnol. Mag.
	IEEE Comput. Graph. Appl.	IEEE Network
	IEEE Comput. Intell. Mag.	IEEE Pers. Commun.
	IEEE Comput. Sci. Eng. Mag.	IEEE Potentials
	IEEE Computer	IEEE Power Eng. Rev.
	IEEE Concurrency	IEEE Robot. Automat. Mag.
	IEEE Control. Syst. Mag.	IEEE Signal Processing Mag. *(1991–present)*
	IEEE Des. Test Comput.	IEEE Softw.
	IEEE Electr. Insul. Mag.	IEEE Spectr.
	IEEE Eng. Manag. Rev.	IEEE Technol. Soc. Mag.
	IEEE Eng. Med. Biol. Mag.	IEEE Veh. Technol. Mag.
	IEEE Expert *(until 1997)*	Today's Eng.

IEEE Transactions abbreviations

IEEE Adv. Packag.
IEEE/ACM Trans. Netw.
IEEE Human–Factors Electron. *(until 1968)*
IEEE Man–Mach. Syst. *(until 1970)*
IEEE Trans. Acoust., Speech, Signal Process. *(1975–1990)*
IEEE Trans. Aeronaut. Navig. Electron.
IEEE Trans. Aerosp.
IEEE Trans. Aerosp. Electron. Syst.
IEEE Trans. Aerosp. Navig. Electron.
IEEE Trans. Airbone Electron.
IEEE Trans. Antennas Propag.
IEEE Trans. Appl. Supercond.
IEEE Trans. Audio Electroacoust. *(until 1974)*
IEEE Trans. Autom. Control
IEEE Trans. Biomed. Circuits Syst.
IEEE Trans. Biomed. Eng.
IEEE Trans. Broadcast.
IEEE Trans. Broadcast. Technol.
IEEE Trans. Circuit Theory *(until 1973)*
IEEE Trans. Circuits Syst. *(1974–1992)*
IEEE Trans. Circuits Syst. I, Fundam. Theory Appl. *(until 2003)*
IEEE Trans. Circuits Syst. I, Reg. Papers
IEEE Trans. Circuits Syst. II, Analog Digit. Signal Process. *(until 2003)*
IEEE Trans. Circuits Syst. II, Exp. Briefs
IEEE Trans. Circuits Syst. Video Technol.
IEEE Trans. Commun.
IEEE Trans. Commun. Technol. *(until 1971)*
IEEE Trans. Compon. Hybrids, Manuf. Technol. *(1978—1993)*
IEEE Trans. Compon. Packag. Manuf. Technol. A *(1994–1998)*
IEEE Trans. Compon. Packag. Manuf. Technol. B *(1994–1998)*
IEEE Trans. Compon. Packag. Manuf. Technol. C *(1996–1998)*
IEEE Trans. Compon. Packag. Technol.
IEEE Trans. Comput.
IEEE Trans. Comput.-Aided Des. Integr. Circuits Syst.
IEEE Trans. Consum. Electron.
IEEE Trans. Control Syst. Technol.
IEEE Trans. Dev. Mat. Rel.
IEEE Trans. Dielectr. Electr. Insul.
IEEE Trans. Edu.
IEEE Trans. Electromagn. Compat.
IEEE Trans. Electron Devices
IEEE Trans. Electron. Packag. Manuf.
IEEE Trans. Energy Convers.
IEEE Trans. Eng. Manag.
IEEE Trans. Evol. Comput.
IEEE Trans. Fuzzy Syst.
IEEE Trans. Geosci. Electron. *(1962–1979)*
IEEE Trans. Geosci. Remote Sens.
IEEE Trans. Image Process.
IEEE Trans. Ind. Appl.
IEEE Trans. Ind. Electron.
IEEE Trans. Ind. Informat.
IEEE Trans. Inf. Forens. Security
IEEE Trans. Inf. Technol. Biomed.
IEEE Trans. Inf. Theory
IEEE Trans. Instrum.
IEEE Trans. Instrum. Meas.
IEEE Trans. Intell. Transp. Syst.
IEEE Trans. Knowl. Data Eng.
IEEE Trans. Magn.
IEEE Trans. Manuf. Technol. *(1972–1977)*
IEEE Trans. Mechatron.
IEEE Trans. Med. Imag.
IEEE Trans. Microw. Guid. Wave Lett. *(1987–1999)*
IEEE Trans. Microw. Theory Tech.
IEEE Trans. Microw. Wireless Compon. Lett. *(until 2004)*
IEEE Trans. Mil. Electron.
IEEE Trans. Multimedia
IEEE Trans. Nanotechnol.
IEEE Trans. Neural Netw.
IEEE Trans. Neural Syst. Rehabil. Eng.
IEEE Trans. Nucl. Sci.
IEEE Trans. Parallel Distrib. Syst.
IEEE Trans. Parts, Hybrids, Packag. Technol. *(June 1971–1977)*
IEEE Trans. Parts, Mater. Packag.
IEEE Trans. Pattern Anal. Mach. Intell.
IEEE Trans. Plasma Sci.
IEEE Trans. Power App. Syst. *(until 1985)*
IEEE Trans. Power Del.
IEEE Trans. Power Electron.
IEEE Trans. Power Syst.
IEEE Trans. Prof. Commun.
IEEE Trans. Rehabil. Eng. *(until 2000)*
IEEE Trans. Reliab.
IEEE Trans. Robot. Autom.
IEEE Trans. Semicond. Manuf.
IEEE Trans. Signal Process.
IEEE Trans. Softw. Eng.
IEEE Trans. Sonics Ultrason. *(until 1985)*
IEEE Trans. Speech Audio Process.
IEEE Trans. Syst. Man Cybern. *(1971–1995)*
IEEE Trans. Syst. Man Cybern. A., Syst. Humans
IEEE Trans. Syst. Man Cybern. B, Cybern.
IEEE Trans. Syst. Man Cybern. C, Appl. Rev.
IEEE Trans. Ultrason. Eng.
IEEE Trans. Ultrason. Ferroelectr. Freq. Control
IEEE Trans. Veh. Technol.
IEEE Trans. Very Large Scale Integr. (VLSI) Syst.
IEEE Trans. Vis. Comput. Graphics
IEEE Trans. Wireless Commun.

References

NOTE: Use *et al.* when three or more names are given.

References in Text:

References need not be cited in the text. When they are, they appear on the line, in square brackets, *inside the punctuation.* Grammatically, they may be treated as if they were footnote numbers, e.g.,

as shown by Brown [4], [5]; as mentioned earlier [2], [4]–[7], [9]; Smith [4] and Brown and Jones [5]; Wood et al. [7]

or as nouns:

as demonstrated in [3]; according to [4] and [6]–[9].

References Within a Reference:

Check the reference list for *ibid.* or *op. cit.* These refer to a previous reference and should be eliminated from the reference section. In text, repeat the earlier reference number and renumber the reference section accordingly. If the *ibid.* gives a new page number, or other information, use the following forms:

[3, Th. 1]; [3, Lemma 2]; [3, pp. 5-10]; [3, eq. (2)]; [3, Fig. 1]; [3, Appendix I]; [3, Sec. 4.5]; [3, Ch. 2, pp. 5-10]; [3, Algorithm 5].

NOTE: Editing of references may entail careful renumbering of references, as well as the citations in text.

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 commas around Jr., Sr., and III in names. If there are many names, use *et al.* Note that when citing IEEE Transactions, if the month is not available, the number may be kept, although it is normally deleted. Keep the day of the month when referencing a patent. 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.

When the word below appears in the reference, abbreviate to

Acoustics	Acoust.
Administration	Admin.
Administrative	Administ.
American	Amer.
Analysis	Anal.
Annals	Ann.
Annual	Annu.
Apparatus	App.
Applications	Applicat.
Applied	Appl.
Association	Assoc.
Automatic	Automat.
Broadcasting	Broadcast.
Business	Bus.
Communications	Commun.
Computer(s)	Comput.
Congress	Congr.
Convention	Conv.
Correspondence	Corresp.
Cybernetics	Cybern.
Department	Dept.
Development	Develop.
Digest	Dig.
Economic(s)	Econ.
Education	Educ.

Electrical	Elect.
Electronic	Electron.
Engineering	Eng.
Ergonomics	Ergonom.
Evolutionary	Evol.
Foundation	Found.
Geoscience	Geosci.
Graphics	Graph.
Industrial	Ind.
Industry	Ind.
Information	Inform.
Institute	Inst.
Intelligence	Intell.
International	Int.
Journal	J.
Letter(s)	Lett.
Machine	Mach.
Magazine	Mag.
Management	Manage.
Managing	Manag.
Mathematic(s)	Math.
Mathematical	Math.
Mechanical	Mech.
National	Nat.
Newsletter	Newslett.

Nuclear	Nucl.
Occupation	Occupat.
Philosophical	Philosph.
Proceedings	Proc.
Processing	Process.
Production	Prod.
Productivity	Productiv.
Quarterly	Quart.
Record	Rec.
Reliability	Rel.
Report	Rep.
Royal	Roy.
Science	Sci.
Selected	Select.
Society	Soc.
Sociological	Sociol.
Statistics	Stat.
Studies	Stud.
Supplement	Suppl.
Symposium	Symp.
Systems	Syst.
Technical	Tech.
Telecommunication	Telecommun.
Transactions	Trans.
Vehicular	Veh.
Working	Work.