



**Colegio de San Juan de Letran**  
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Library and Media Services

## **RESEARCH GUIDE: ELECTRICAL CIRCUITS**

### **TABLE OF CONTENTS**

#### **I. Scope Note**

#### **II. Search Aids**

#### **III. Information Resources**

##### **A. Library Resources**

###### **a. E-Journals**

###### **b. E-Theses**

##### **B. Open Access**

###### **a. Free E-Books**

###### **b. Free E-Journals**

###### **c. Free E-Theses**

##### **C. Professional Organizations**

##### **D. Other Related Web Portals**

##### **E. Related Research Guides**

#### **IV. Tutorials**

## RESEARCH GUIDES

### ELECTRICAL CIRCUITS

#### I. SCOPE NOTE

*Electric circuit is a path for transmitting electric current. An electric circuit includes a device that gives energy to the charged particles constituting the current, such as a battery or a generator; devices that use current, such as lamps, electric motors, or computers; and the connecting wires or transmission lines. Two of the basic laws that mathematically describe the performance of electric circuits are Ohm's law and Kirchhoff's rules. [britannica.com](http://britannica.com)*

#### II. SEARCH AIDS (BT: Broader Term, RT: Related Term, NT: Narrow Term)

##### BT:

- Circuits

##### RT:

- DC/AC sources
- Electrical circuit components
- Voltage and current laws
- Mesh and nodal analysis
- Circuit analysis techniques
- Energy storing elements
- RL and RC circuits
- RLC circuits
- Sinusoidal Steady-state analysis
- AC circuit power analysis
- Analysis of polyphase circuit
- Analysis of magnetically-coupled circuits
- Frequency response
- Per unit system
- Symmetrical components of unbalanced 3-phase voltages and currents
- Analysis of two-port networks

##### NT:

- Linearity and superposition
- Source transformation
- Thevenin and Norton equivalent circuits
- Maximum power transfer
- Delta-wye conversion
- Capacitors and capacitance
- Inductors and inductance
- Source free RL and RC circuits
- Driven RL and RC circuits
- Source free series and parallel RLC circuits

- Impedance and admittance
- Average power
- Apparent power
- Power factor
- Power factor correction
- 3-phase, 3-wire system
- 3-phase, 4-wire system
- Mutual inductance
- Parallel resonance
- Series resonance
- Network parameters
- Network responses
- Network interconnection

### III. INFORMATION RESOURCES

#### A. LIBRARY RESOURCES

*Note: For the appropriate access credentials, please contact the Letran Bataan Library*

#### ➤ E-JOURNALS

- Journal of Optimization Theory and Applications.  
[https://www.proquest.com/central/publication/publications\\_48247](https://www.proquest.com/central/publication/publications_48247)
- IEEE Transactions on Magnetics.  
[https://www.proquest.com/central/publication/publications\\_85461](https://www.proquest.com/central/publication/publications_85461)
- American Journal of Physics.  
[https://www.proquest.com/central/publication/publications\\_44916](https://www.proquest.com/central/publication/publications_44916)
- Entropy. [https://www.proquest.com/central/publication/publications\\_2032401](https://www.proquest.com/central/publication/publications_2032401)
- International Journal of Electrical Engineering & Education.  
[https://www.proquest.com/central/publication/publications\\_37651](https://www.proquest.com/central/publication/publications_37651)
- Applied Mechanics and Materials.  
[https://www.proquest.com/central/publication/publications\\_2029177](https://www.proquest.com/central/publication/publications_2029177)
- Measurement Techniques.  
[https://www.proquest.com/central/publication/publications\\_54071](https://www.proquest.com/central/publication/publications_54071)
- Structural and Multidisciplinary Optimization.  
[https://www.proquest.com/central/publication/publications\\_2043658](https://www.proquest.com/central/publication/publications_2043658)
- The European Physical Journal. B.  
[https://www.proquest.com/central/publication/publications\\_2043700](https://www.proquest.com/central/publication/publications_2043700)
- The International Journal of Advanced Manufacturing Technology.  
[https://www.proquest.com/central/publication/publications\\_2044010](https://www.proquest.com/central/publication/publications_2044010)
- Electrical Engineering & Electromechanics.  
[https://www.proquest.com/central/publication/publications\\_2045984](https://www.proquest.com/central/publication/publications_2045984)
- Journal of Physics: Conference Series.  
[https://www.proquest.com/central/publication/publications\\_4998668](https://www.proquest.com/central/publication/publications_4998668)
- International Journal of Circuit Theory and Applications.

- [https://search.proquest.com/central/publication/publications\\_996369](https://search.proquest.com/central/publication/publications_996369)
- Journals of Circuits, Systems and Computers.  
[https://search.proquest.com/central/publication/publications\\_2049873](https://search.proquest.com/central/publication/publications_2049873)
- I Manager's Journal on Circuits & Systems.  
[https://search.proquest.com/central/publication/publications\\_2037361](https://search.proquest.com/central/publication/publications_2037361)
- Journal of Computational Electronics.  
[https://search.proquest.com/central/publication/publications\\_2043855](https://search.proquest.com/central/publication/publications_2043855)

#### ➤ E-THESES

- Kim, T. (2015). Model-based condition monitoring and power management for rechargeable electrochemical batteries (Order No. 3700290). Available from ProQuest Central. (1680018998). Retrieved from <https://www.proquest.com/dissertations-theses/model-based-condition-monitoring-power-management/docview/1680018998/se-2?accountid=190548>
- Moses, K. (2019). The effects of using A mobile digital assistive tutor for circuit analysis on students' academic achievement, problem-solving and self-efficacy (Order No. 13813906). Available from ProQuest Central. (2276899447). Retrieved from <https://www.proquest.com/dissertations-theses/effects-using-mobile-digital-assistive-tutor/docview/2276899447/se-2?accountid=190548>
- Jilek, J. M. (2006). A framework for the examination of theories of electricity: Implications for post-secondary electrical engineering technology education (Order No. NR50348). Available from ProQuest Central. (304950988). Retrieved from <https://www.proquest.com/dissertations-theses/framework-examination-theories-electricity/docview/304950988/se-2?accountid=190548>
- Carnes, M. T. (2016). Conceptual understanding of threshold concepts of electrical phenomena: Mental models of senior undergraduates in electrical engineering (Order No. 10244516). Available from ProQuest Central. (1875556309). Retrieved from <https://www.proquest.com/dissertations-theses/conceptual-understanding-threshold-concepts/docview/1875556309/se-2?accountid=190548>
- Stamness, R. L. (2010). Improvement of a propagation delay model for CMOS digital logic circuits (Order No. 1477363). Available from ProQuest Central. (597940807). Retrieved from <https://www.proquest.com/dissertations-theses/improvement-propagation-delay-model-cmos-digital/docview/597940807/se-2?accountid=190548>
- Sandraz, J. (2014). Physical and measurable energy flow in nonlinear ac electrical circuits: Standard and proposed power quantities (Order No. 3629555). Available from ProQuest Central. (1562268621). Retrieved from <https://search.proquest.com/docview/1562268621?accountid=190548>
- Jain, R. (2018). Smartphones for control and detection of rapid diagnostic tests (Order No. 10749926). Available from ProQuest Central. (2034402456). Retrieved from <https://search.proquest.com/docview/2034402456?accountid=190548>
- Pitterson, N. P. (2015). Undergraduate engineering students' understanding of complex circuits: An investigation of the intersection of students' prior knowledge, design of learning environments and the nature of the content (Order No. 10076053). Available from ProQuest Central. (1777609494). Retrieved from <https://search.proquest.com/docview/1777609494?accountid=190548>

- Vichik, S. (2015). Quadratic and linear optimization with analog circuits (Order No. 10086165). Available from ProQuest Central. (1779253220). Retrieved from <https://search.proquest.com/docview/1779253220?accountid=190548>
- Creveling, D. R. (2008). Parameter and state estimation in nonlinear dynamical systems (Order No. 3336421). Available from ProQuest Central. (304660884). Retrieved from <https://search.proquest.com/docview/304660884?accountid=190548>

## B. OPEN ACCESS

### ➤ FREE E-BOOKS

- Buchla, David. (1996). Experiments in Electronics Fundamentals and Electric Circuits Fundamentals: To Accompany Floyd, Electronics Fundamentals and Electric Circuit Fundamentals. New Jersey: Upper Prentice Hall. <https://www.pdfdrive.com/experiments-in-electronics-fundamentals-and-electric-circuits-fundamentals-to-accompany-floyd-electronics-fundamentals-and-electric-circuit-fundamentals-d162490532.html>
- Buchla, David. (2014). Electronics Fundamentals. Circuits, Devices, and Applications. England: Pearson Education. <https://www.pdfdrive.com/electronics-fundamentals-circuits-devices-and-applications-d166727002.html>
- Robertson, Christopher. (2008). Fundamental Electrical and Electronic Principles, Third Edition. Amsterdam: Elsevier. <https://www.pdfdrive.com/fundamental-electrical-and-electronic-principles-third-edition-d17493411.html>
- Bird, John. (2007). Electrical Circuit Theory and Technology, 3<sup>rd</sup> edition. Amsterdam: Elsevier. <https://www.pdfdrive.com/electrical-circuit-theory-and-technology-thirdedition-electrical-circuit-theory-and-technology-d162459767.html>
- Nahvi, Mahmood. (2003). Theory and Problems of ELECTRIC CIRCUITS, 4<sup>th</sup> edition. New York: McGraw Hill. <https://www.pdfdrive.com/schaums-outline-of-theory-andproblems-of-electric-circuits-d33461668.html>
- Schubert, Tomas F. and Kim, Ernest M. (2014). Fundamentals of Electronics: Book 1 Electronic Devices and Circuit Applications. Morgan & Claypool Publisher. <https://www.pdfdrive.com/fundamentals-of-electronics-book-1-electronic-devices-andcircuit-applications-d186374504.html>
- Kishore, K. Lal. (2008). Electronic Devices and Circuits. India: BS Publisher. <https://www.pdfdrive.com/electronic-devices-and-circuits-d33544943.html>

### ➤ FREE E-JOURNALS

- Journal of Electrical & Electronic Systems. <https://www.hilarispublisher.com/electrical-electronic-systems.html>
- Electricity. <https://www.mdpi.com/journal/electricity>
- International Journal of Circuit Theory and Applications. <https://onlinelibrary.wiley.com/journal/1097007x>
- International Journal of Electrical Power & Energy Systems. <https://www.journals.elsevier.com/international-journal-of-electrical-power-and-energy-systems/open-access-articles>

- The International Journal of Electrical Engineering & Education. <https://journals.sagepub.com/home/ije>
- IEEE Open Journal of Circuits and Systems. <https://ieeecas.org/publications/openjournal-circuits-and-systems>
- Electronics – Open Access Journal. <https://www.mdpi.com/journal/electronics>
- Electrical & Electronic Technology Open Access Journal. <https://publons.com/journal/60863/electrical-electronic-technology-open-access-journ/>

#### ➤ FREE E-THESSES

- Ng, R. W. T. (2011). Low power digital type analog-to-digital converter. (Thesis). Nanyang Technological University. Retrieved from <http://hdl.handle.net/10356/47580>
- Chugh, P. P. (2012). Switch level optimization for CMOS circuits. (Masters Thesis). Texas A&M University. Retrieved from <http://hdl.handle.net/1969.1/ETD-TAMU-1997-THESIS-C485>
- Jacob, M. M. (2016). Non-Foster Circuits for High Performance Antennas: Advantages and Practical Limitations. (Thesis). University of California – San Diego. Retrieved from <http://www.escholarship.org/uc/item/2pq549c3>
- Shankar, A. (2012). Low voltage amplifier architecture for high speed switched capacitor circuits. (Masters Thesis). Texas A&M University. Retrieved from <http://hdl.handle.net/1969.1/ETD-TAMU-2001-THESIS-S52>
- Minárik, M. (2020). Autonomní metoda řešení elektrických obvodů: Autonomous Electronic Circuits Simulation Method. (Thesis). Brno University of Technology. Retrieved from <http://hdl.handle.net/11012/187828>
- Alam, S. (2015). Modelling, analysis and design of bioelectronic circuits in VLSI. (Doctoral Dissertation). Massey University. Retrieved from <http://hdl.handle.net/10179/7731>
- Hart, P. M. (2021). Measurement and application of power system equivalent circuits. (Thesis). Monash University. Retrieved from <https://doi.org/10.26180/14966760.v1>
- Zargarani, A. (2016). Circuit optimization for enhancing the output power of a piezoelectric energy harvester. (Masters Thesis). University of Alabama. Retrieved from <http://ir.ua.edu/handle/123456789/3208>
- Ren, M. (2015). Integrated tunable laser controlled by nano-silicon-photonics circuits. (Thesis). Nanyang Technological University. Retrieved from <http://hdl.handle.net/10356/62226>
- Kishor, R. (2013). Modelling of saw structures and design of saw biosensor circuits and devices. (Thesis). Nanyang Technological University. Retrieved from <http://hdl.handle.net/10356/54747>
- Mendez Rivera, M. G. (2012). On-chip spectrum/vector analyzer for built-in testing of analog integrated circuits. (Masters Thesis). Texas A&M University. Retrieved from <http://hdl.handle.net/1969.1/ETD-TAMU-2002-THESIS-M445>
- Coya, B. H. (2018). Circuits, Bond Graphs, and Signal-Flow Diagrams: A Categorical Perspective. (Thesis). University of California – Riverside. Retrieved from <http://www.escholarship.org/uc/item/56r8s2q6>
- Pham, V. T. (2013). Memristor-based and time-delay nonlinear circuits. (Thesis). Università degli Studi di Catania. Retrieved from <http://hdl.handle.net/10761/1306>

- Kadák, M. (2018). Vizuální editor elektrických schemat: Electronic Circuits Editor. (Thesis). Brno University of Technology. Retrieved from <http://hdl.handle.net/11012/52744>
- Ko, H. H. (2012). Development and characterization of ultralow-k porous polyimide as flexible substrate with electrical circuits. (Thesis). Hong Kong University of Science and Technology. [http://repository.ust.hk/ir/bitstream/1783.1-73355/1/th\\_redirect.html](http://repository.ust.hk/ir/bitstream/1783.1-73355/1/th_redirect.html)
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- Chakrabarti, A. (2016). Architectures and Integrated Circuits for Efficient, High-power "Digital" Transmitters for Millimeter-wave Applications. (Doctoral Dissertation). Columbia University. Retrieved from <https://doi.org/10.7916/D8XP74VT>
- Zou, X. (2019). Micro-electro-mechanical Resonator-Based Digital and Interface Elements for Low Power Circuits. (Thesis). King Abdullah University of Science and Technology. Retrieved from <http://hdl.handle.net/10754/660269>
- Alam, S. (2015). Modelling, analysis and design of bioelectronics circuits in VLSI. (Doctoral Dissertation). Massey University. Retrieved from <http://hdl.handle.net/10179/7731>
- Li, Y. (2017). Low-cost, high-precision DAC design based on ordered element matching and verification against undesired operating points for analog circuits. (Thesis). Iowa State University. Retrieved from <https://lib.dr.iastate.edu/etd/17249>

### C. PROFESSIONAL ORGANIZATIONS

- Institution of Electrical & Electronics Engineer. <https://www.ieee.org/>
- The Institution of Engineering & Technology. <https://www.theiet.org/>
- Electronic Power Research Institute. <https://www.epri.com/>
- American Society for Engineering Education. <http://www.asee.org/>
- IEEE Communication Society. <https://www.comsoc.org/>

### D. OTHER RELATED WEB PORTALS

- Virtual Labs. <https://www.vlab.co.in/>
- MIT Open Courseware. <https://ocw.mit.edu/index.htm>
- Makezine. <https://makezine.com/>
- Electronics Weekly. <https://www.electronicweekly.com/>
- Tutorials Point. <https://www.tutorialspoint.com/index.htm>
- Wolfram. <https://demonstrations.wolfram.com/>
- All about Circuits. <https://www.allaboutcircuits.com/>
- Electrical 4 U. <https://www.electrical4u.com/>
- Electronics. <http://electronics.wisc-online.com/>
- Electrical Engineering Portal. <https://electrical-engineering-portal.com/>

### E. RELATED RESEARCH GUIDES

- University Houston Library. <https://guides.lib.uh.edu/ece>
- University of Melbourne. [https://unimelb.libguides.com/elec\\_eng](https://unimelb.libguides.com/elec_eng)
- Bloomsburg Library. <https://guides.library.bloomu.edu/c.php?g=318635&p=2127019>
- Washington University Library. <https://libguides.libraries.wsu.edu/EE>

- Northwestern Library. <https://libguides.northwestern.edu/eecs>

#### IV. TUTORIALS

- The Physics Classroom. <https://www.physicsclassroom.com/class/circuits>
- Lesson 1 - Voltage, Current, Resistance (Engineering Circuit Analysis). [https://www.youtube.com/watch?v=OGa\\_b26eK2c](https://www.youtube.com/watch?v=OGa_b26eK2c)
- Basic Electronics For Beginners. <https://www.youtube.com/watch?v=uXr4lXYjXuU>
- Basic Relationships, Concepts and Laws of Electric Circuits. <https://www.allaboutcircuits.com/video-tutorials/essential-concepts-of-electric-circuits/>
- Electric Circuit Analysis Tutorial - Physics GCSE. <https://www.youtube.com/watch?v=vRdlQLOPTUA>
- Electric Current & Circuits Explained, Ohm's Law, Charge, Power, Physics Problems, Basic Electricity. [https://www.youtube.com/watch?v=r-SCyD7f\\_zl](https://www.youtube.com/watch?v=r-SCyD7f_zl)
- Electrical Wiring: Electrical circuits wiring tutorial. <https://www.youtube.com/watch?v=9uMIQycxygQ>
- Electrical Circuits: The Basics. <https://www.youtube.com/watch?v=k7aPL5cnYsM>
- Explaining an Electrical Circuit. <https://www.youtube.com/watch?v=VnnpLaKsqGU>
- Circuit Basics - The Learning Circuit. <https://www.youtube.com/watch?v=iZYedWOERNO>
- Basic Electronics For Beginners. <https://www.youtube.com/watch?v=uXr4lXYjXuU>
- Spark Fun. <https://learn.sparkfun.com/tutorials/what-is-a-circuit/all>
- Tutorials Point. [https://www.tutorialspoint.com/electronic\\_circuits/index.htm](https://www.tutorialspoint.com/electronic_circuits/index.htm)
- All about Circuits. <https://www.allaboutcircuits.com/video-tutorials/>
- Circuits Today. <https://www.circuitstoday.com/category/tutorials>
- The Physics Classroom. <https://www.physicsclassroom.com/class/circuits>

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