

Operational Amplifiers

Linear Integrated Circuits

Operational amplifier

pages; 2005; ISBN 978-0-7506-7844-5. (17 MB PDF)
Operational Amplifiers and Linear Integrated Circuits; 6th
Ed; Robert Coughlin, Frederick Driscoll; Prentice

An operational amplifier (often op amp or opamp) is a DC-coupled electronic voltage amplifier with a differential input, a (usually) single-ended output, and an extremely high gain. Its name comes from its original use of performing mathematical operations in analog computers.

By using negative feedback, an op amp circuit's characteristics (e.g. its gain, input and output impedance, bandwidth, and functionality) can be determined by external components and have little dependence on temperature coefficients or engineering tolerance in the op amp itself. This flexibility has made the op amp a popular building block in analog circuits.

Today, op amps are used widely in consumer, industrial, and scientific electronics. Many standard integrated circuit op amps cost only a few cents; however, some...

Operational transconductance amplifier

-Bobbs-Merrill First Ed. 1974) p. 440 et seq.
"LM13700 Dual Operational Transconductance
Amplifiers With Linearizing Diodes and Buffers"
(PDF). Texas Instruments. 15

The operational transconductance amplifier (OTA) is an amplifier that outputs a current proportional to its input voltage. Thus, it is a voltage controlled current source.

Three types of OTAs are single-input single-output, differential-input single-output, and differential-input differential-output (a.k.a. fully differential), however this article focuses on differential-input single-output. There may be an additional input for a current to control the amplifier's transconductance.

The first commercially available integrated circuit units were produced by RCA in 1969 (before being acquired by General Electric) in the form of the CA3080. Although most units are constructed with bipolar transistors, field effect transistor units are also produced.

Like a standard operational amplifier, the...

Amplifier

*an integrated circuit, as in an op-amp.[citation needed]
Transistor amplifiers (or solid state amplifiers) are the most common type of amplifier in use*

An amplifier, electronic amplifier or (informally) amp is an electronic device that can increase the magnitude of a signal (a time-varying voltage or current). It is a two-port electronic circuit that uses electric power from a power supply to increase the amplitude (magnitude of the voltage or current) of a signal applied to its input terminals, producing a proportionally greater amplitude signal at its output. The amount of amplification provided by an amplifier is measured by its gain: the ratio of output voltage, current, or power to input. An amplifier is defined as a circuit that has a power gain greater than one.

An amplifier can be either a separate piece of equipment or an electrical circuit contained within another device. Amplification is fundamental to modern electronics, and amplifiers...

Operational amplifier applications

This article illustrates some typical operational amplifier

applications. Operational amplifiers are optimised for use with negative feedback, and this

This article illustrates some typical operational amplifier applications. Operational amplifiers are optimised for use with negative feedback, and this article discusses only negative-feedback applications. When positive feedback is required, a comparator is usually more appropriate. See Comparator applications for further information.

Current-feedback operational amplifier

Design with Operational Amplifiers and Analog Integrated Circuits. McGraw-Hill. p. 299. ISBN 0-07-232084-2.
"Current Feedback Amplifiers" by Erik Barnes

The current-feedback operational amplifier (CFOA or CFA) is a type of electronic amplifier whose inverting input is sensitive to current, rather than to voltage as in a conventional voltage-feedback operational amplifier (VFA). The CFA was invented by David Nelson at Comlinear Corporation, and first sold in 1982 as a hybrid amplifier, the CLC103. An early patent covering a CFA is U.S. patent 4,502,020, David Nelson and Kenneth Saller (filed in 1983). The integrated circuit CFAs were introduced in 1987 by both Comlinear and Elantec (designer Bill Gross). They are usually produced with the same pin arrangements as VFAs, allowing the two types to be interchanged without rewiring when the circuit design allows. In simple configurations, such as linear amplifiers, a CFA can be used in place of a...

Linear integrated circuit

A linear integrated circuit or analog chip is a set of miniature electronic analog circuits formed on a single piece of semiconductor material. The voltage

A linear integrated circuit or analog chip is a set of miniature electronic analog circuits formed on a single piece of semiconductor material.

Instrumentation amplifier

Isolation amplifier Operational amplifier applications R. F. Coughlin, F. F. Driscoll Operational Amplifiers and Linear Integrated Circuits (2nd ed. 1982.

An instrumentation amplifier (sometimes shorthand as in-amp or InAmp) is a precision differential amplifier that has been outfitted with input buffer amplifiers, which eliminate the need for input impedance matching and thus make the amplifier particularly suitable for use in measurement and test equipment. Additional characteristics include very low DC offset, low drift, low noise, very high open-loop gain, very high common-mode rejection ratio, and very high input impedances. Instrumentation amplifiers are used where great accuracy and stability of the circuit both short- and long-term are required.

Although the instrumentation amplifier is usually shown schematically identical to a standard operational amplifier (op-amp), the electronic instrumentation amplifier is almost always internally...

Valve amplifier

valve amplifiers for frequencies below the microwaves were largely replaced by solid state amplifiers in the 1960s and 1970s. Valve amplifiers can be

A valve amplifier or tube amplifier is a type of electronic amplifier that uses vacuum tubes to increase the amplitude or power of a signal. Low to medium power valve amplifiers for frequencies below the microwaves were largely replaced by solid state amplifiers in the 1960s and 1970s.

Valve amplifiers can be used for applications such as guitar amplifiers, satellite transponders such as DirecTV and GPS, high quality stereo amplifiers, military applications (such as radar) and very high power radio and UHF television transmitters.

Norton amplifier

p. 234 Carr, Joseph, Linear Integrated Circuits, Newnes, 1996 ISBN 0750625910. Bali, S.P., Linear Integrated Circuits, Tata McGraw-Hill Education, 2008

A Norton amplifier or current differencing amplifier (CDA) is an electronic amplifier with two low impedance current inputs and one low impedance voltage output where the output voltage is proportional to the difference between the two input currents. It is a current controlled voltage source (CCVS) controlled by the difference of two input currents.

The Norton amplifier can be regarded as the dual of the operational transconductance amplifier (OTA) which takes a differential voltage input and provides a high impedance current output. The OTA has a gain measured in units of transconductance (siemens) whereas the Norton amplifier has a gain measured in units of transimpedance (ohms).

A commercial example of this circuit is the LM3900 quad operational amplifier and its high speed cousin the...

Advanced Linear Devices

developed at ALD are rail to rail operational amplifiers, Function Specific ASIC (Application Specific Integrated Circuits), low charge injection analog switches

Advanced Linear Devices Incorporated, also known as ALD, is a semiconductor device design and manufacturing company based in Sunnyvale, California. The company develops and manufactures precision analog CMOS linear integrated circuits for industrial controls, instrumentation, computers, medical devices, automotive, and telecommunications products. It is best known for its redesign of the 555 timer IC as a low-voltage CMOS device.

The company provides MOSFET arrays, including

proprietary designs with zero voltage thresholds. They also produce and operational amplifiers, analog voltage comparators used in electronic systems as current sources and voltage references.

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