

Z

Z See: operational impedance.

Z-address (test pattern language) The coordinates by which a matrix in a memory is specified. (TT/C) 660-1986w

Z-axis amplifier (oscilloscopes) An amplifier for signals controlling a display perpendicular to the X-Y plane (commonly intensity of the spot). See also: oscillograph; intensity amplifier. (IM) 311-1970w

ZBASIC A dialect of the BASIC programming language. (C) 610.13-1993w

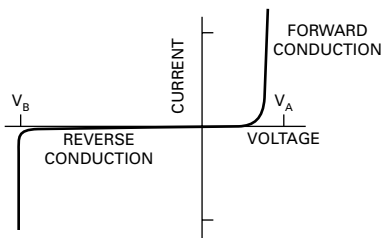
Zeeman effect If an electric discharge tube, or other light source emitting a bright-line spectrum, is placed between the poles of a magnet, each spectrum line is split by the action of the magnetic field into three or more close-spaced but separate lines. The amount of splitting or the separation of the lines, is directly proportional to the strength of the magnetic field. (Std100) 270-1966w

zeitgebers Biological triggers that respond to external stimuli and that influence the circadian rhythm. See also: circadian rhythm. (T&D/PE) 539-1990

Zener breakdown (semiconductor devices) A breakdown that is caused by the field emission of charge carriers in the depletion layer. See also: semiconductor device; semiconductor. (ED) 216-1960w

Zener diode (semiconductor) A class of silicon diodes that exhibit in the avalanche-breakdown region a large change in reverse current over a very narrow range of reverse voltage. Note: This characteristic permits a highly stable reference voltage to be maintained across the diode despite a relatively wide range of current through the diode. See also: Zener breakdown; avalanche breakdown. (AES) [41]

Zener diode regulator A voltage regulator that makes use of the constant-voltage characteristic of the Zener diode to produce a reference voltage that is compared with the voltage to be regulated to initiate correction when the voltage to be regulated varies through changes in either load or input voltage. (See the corresponding figure.) See also: Zener diode.



Current and voltage characteristics for a typical Zener diode regulator $|V_A| \gg |V_B|$

Zener diode regulator

(AES) [41]

Zener impedance See: breakdown impedance; semiconductor.

Zener voltage See: semiconductor; breakdown voltage.

zero (1) (function) (root of an equation) A zero of a function $f(x)$ is any value of the argument X for which $f(x) = 0$. Note: Thus the zeros of $\sin x$ are $x_1 = 0, x_2 = \pi, x_3 = 2\pi, x_4 = 3\pi, \dots, x_n = (n-1)\pi, \dots$. The roots of the equation $f(x) = 0$ are the zeros of $f(x)$. (Std100) 270-1966w

(2) (A) (transfer function in the complex variables) A value of s that makes the function zero. **(B)** The corresponding point in the s plane. See also: pole; feedback control system. (IM) [120]

(3) (network function) Any value of p , real or complex, for which the network function is zero. See also: network analysis. (Std100) 270-1966w

(4) A false logic state or a false condition of a variable. (C/BA) 1496-1993w

zero-address instruction (1) (software) A computer instruction that contains no address fields. Contrast: one-address instruction; three-address instruction; four-address instruction; two-address instruction. (C) 610.12-1990

(2) An instruction that has no address field because the address is implied or no address is required. Synonyms: implicit address instruction; no-address instruction; addressless instruction. See also: repetitive addressing. (C) 610.10-1994w

zero adjuster A device for bringing the indicator of an electric instrument to a zero or fiducial mark when the electrical quantity is zero. See also: moving element. (EEC/PE) [119]

zero-based linearity See: linearity.

zero-beat reception See: homodyne reception.

zero bias retention (metal-nitride-oxide field-effect transistor) This is the retention inherent in the metal-nitride-oxide semiconductor (MNOS) transistor when all terminals are grounded during information storage. The time period is defined by an (extrapolated) zero window between the two high-conduction (HC) and low-conduction (LC) threshold voltage curves plotted versus the logarithm of t_{rd} , the time elapsed between writing and threshold voltage measurement. Synonym: relaxation time. (ED) 581-1978w

zero-byte timeslot interchange A method of coding in which a variable address code is exchanged for any zero octet. The address information describes where, in the serial bitstream, zero octets originally occurred. It is a five-step process where data enters a buffer, zero octets are identified and removed, the nonzero bytes move to fill in the gaps, the first gap is identified, and a transparent flag bit is set in front of the message to indicate that one or more bytes originally contained zeros. (COM/TA) 1007-1991r

zero carryover (1) (bolometric power meters) A characteristic of multirange direct reading bolometer bridges that is a measure of the ability of the meter to maintain a zero setting from range to range without readjustment after initially being set to zero on the most sensitive range. (IM) 544-1975w

(2) (electrothermic power meters) A characteristic of multirange direct reading electrothermic power indicators which is a measure of the ability of the meter to maintain a zero setting from range to range without readjustment after initially being set to zero on the most sensitive range. Expressed in terms of percentage of full scale. (IM) 544-1975w

zero complement See: radix complement.

zero compression See: zero suppression.

zero control current residual voltage (Hall effect devices)

The voltage across the Hall terminals that is caused by a time-varying magnetic field when there is no control current. (MAG) 296-1969w

zero direct current voltage test See: direct-current side short-circuit test.

zero dispersion wavelength That wavelength where the chromatic dispersion of a fiber is at its minimum. (C/LM) 802.3-1998

zero drift (analog computer) Drift with zero input. (C) 165-1977w

zero elimination See: zero suppression.

zero-error (device operating under the specified conditions of use) The indicated output when the value of the input presented to it is zero. See also: feedback control system. (IM) [120]

zero-error reference See: linearity.

zero field residual voltage (Hall effect devices) The voltage across the Hall terminals that exists when control current flows but there is zero applied magnetic field. (MAG) 296-1969w

zero field residual voltage temperature drift (Hall generator)

The maximum change in output voltage per degree Celsius over a given temperature range when operated with zero external field and a given magnitude of control current.

(MAG) 296-1969w

zero field resistive residual voltage (Hall effect devices)

That component of the zero field residual voltage that remains proportional to the voltage across the control current terminals of the Hall generator for a specified temperature.

(MAG) 296-1969w

zero fill (mathematics of computing) (data management)

To fill the digit positions of a storage medium with the representation of the character zero. *Synonym:* zeroize.

(C) 610.5-1990w, 1084-1986w

zero guy A line guy installed in a horizontal position between poles to provide clearance and transfer strain to an adjacent pole. *See also:* tower.

(T&D/PE) [10]

zero inertia system An isolated ac system having no local generation.

(PE/T&D) 1204-1997

zeroize *See:* zero fill.

zero-latency storage A type of storage that has an extremely small rotational delay, or latency. *See also:* disk cache.

(C) 610.10-1994w

zero lead *See:* bioelectric null.

zero-level address *See:* n-level address; immediate address.

zero-minus call (telephone switching systems) A call for which the digit zero is dialed alone to indicate that operator assistance is desired.

(COM) 312-1977w

zero-modulation medium noise (sound recording and reproducing system)

The noise that is developed in the scanning or reproducing device during the reproducing process when a medium is scanned in the zero-modulation state. *Note:* For example, zero-modulation medium noise is produced in magnetic recording by undesired variations of the magnetomotive force in the medium, that are applied across the scanning gap of a demagnetized head, when the medium moves with the desired motion relative to the scanning device. Medium noise can be ascribed to nonuniformities of the magnetic properties and to other physical and dimensional properties of the medium. *See also:* noise.

191-1953w

zero-modulation state (sound recording medium)

The state of complete preparation for playback in a particular system except for omission of the recording signal. *Notes:*

1. Magnetic recording media are considered to be in the zero-modulation state when they have been subjected to the normal erase, bias, and duplication printing fields characteristic of the particular system with no recording signal applied.
2. Mechanical recording media are considered to be in the zero-modulation state when they have been recorded upon and processed in the customary specified manner to form the groove with no recording signal applied.
3. Optical recording media are considered to be in the zero-modulation state when all normal processes of recording and processing, including duplication, have been performed in the customary specified manner, but with no modulation input to the light modulator. *See also:* noise.

191-1953w

zero offset (1) A control function for shifting the reference point in a control system. *See also:* feedback control system.

(IA/ICTL/IAC) [60]

(2) (numerically controlled machines) A characteristic of a numerical machine control permitting the zero point on an axis to be shifted readily over a specified range. The control retains information on the location of the permanent zero. *See also:* floating zero.

(IA) [61]

(3) (rate gyros) (restricted to rate gyros) The gyro output when the input rate is zero, generally expressed as an equivalent input rate. It excludes outputs due to hysteresis and acceleration. *See also:* input-output characteristic.

528-1994

zero-period acceleration (1) (seismic design of substations)

The peak time history acceleration that can be determined from response spectra by the merging of response spectra, for all damping values, in the high-frequency range (usually

above 30 Hz) in which no change of acceleration occurs with frequency.

(PE/SUB) C37.122.1-1993

(2) (seismic qualification of Class 1E equipment for nuclear power generating stations) The acceleration level of the high frequency, nonamplified portion of the response spectrum. This acceleration corresponds to the maximum peak acceleration of the time history used to derive the spectrum.

(PE/NP) 344-1987r

(3) (valve actuators) The acceleration that appears as a constant portion of a response spectrum in the highest frequency range. It is the maximum acceleration in the time history from which that response spectrum was developed.

(PE/NP) 382-1985

(4) (seismic testing of relays) The peak acceleration of the motion/time history that corresponds to the high-frequency asymptote on the response spectrum.

(SWG/PE/PSR) C37.98-1977s, C37.81-1989r

(5) (gas-insulated substations) The peak acceleration experienced by a rigid, single-degree-of-freedom oscillator when it is subjected to the design earthquake either directly to its base or through an intervening structure. *Note:* Generally, a body can be considered rigid, for seismic excitation purposes, if its natural frequency is greater than 30 Hz. The peak acceleration for a body with a natural frequency greater than 30 Hz is the same as that of a body with an infinitely high natural frequency, or conversely, a body with an infinitely small period (zero period). On a response spectrum, the zero-period acceleration is also equal to the asymptotic value of acceleration.

(SUB/PE/SWG-OLD) C37.122-1983s, C37.100-1992

(6) The acceleration level of the high-frequency, nonamplified portion of the response spectrum (e.g., above the cut-off frequency). This acceleration corresponds to the maximum (peak) acceleration of the time history used to derive the spectrum.

(PE/SUB) 693-1997

zero-phase-sequence relay A relay that responds to the zero-phase-sequence component of a polyphase input quantity.

(SWG/PE) C37.100-1992

zero-phase-sequence symmetrical components (unsymmetrical set of polyphase voltages or currents of m phases)

That set of symmetrical components that have zero phase sequence. That is, the angular phase lag from each member to every other member is 0 radians. The members of this set will all reach their positive maxima simultaneously. The zero-phase-sequence symmetrical components for a three-phase set of unbalanced sinusoidal voltages ($m = 3$) having the primitive period are represented by the equations

$$e_{a0} = e_{b0} = e_{c0} = (2)^{1/2} E_{a0} \cos(\omega t + \alpha_{a0})$$

derived from the equation of symmetrical components (set of polyphase alternating voltages). Since in this case $r = 1$ for every component (of first harmonic), the third subscript is omitted. Then k is 0 for the zero sequence, and s takes on the values 1, 2, and 3 corresponding to phases a , b , and c . These voltages have no phase sequence since they all reach their positive maxima simultaneously.

(Std100) 270-1966w

zero-phase symmetrical set (1) (polyphase voltage)

A symmetrical set of polyphase voltages in which the angular phase difference between successive members of the set is zero or a multiple of 2π radians. The equations of symmetrical set (polyphase voltages) represent a zero-phase symmetrical set of polyphase voltages if k/m is zero or an integer. (The symmetrical set of voltages represented by the equations of symmetrical set of polyphase voltages may be said to have zero-phase symmetry if k/m is zero or an integer (positive or negative).) *Note:* This definition may be applied to a two-phase four-wire or five-wire system if m is considered to be 4 instead of 2.

(Std100) 270-1966w

(2) (polyphase currents) This definition is obtained from the corresponding definitions for voltage by substituting the word current for voltage, and the symbol I for E and β for α wherever they appear. The subscripts are unaltered.

(Std100) 270-1966w

zero pip (spectrum analyzer) An output indication that corresponds to zero input frequency. (IM) 748-1979w

zero-plus (telephone switching systems) A call in which the digit zero is dialed as a prefix where operator intervention is necessary. (COM) 312-1977w

zero-power-factor saturation curve (synchronous machines) (zero-power-factor characteristic) The saturation curve of a machine supplying constant current with a power-factor of approximately zero, overexcited. (PE) [9]

zero-power-factor test (synchronous machines) A no-load test in which the machine is overexcited and operates at a power-factor very close to zero. (PE) [9]

zero proof (mathematics of computing) A method of checking computations by adding positive and negative values so that if all computations are accurate the total will be zero. (C) 1084-1986w

zero punch A zone punch in punch row 10 (third from the top) in a twelve-row punch card. *See also:* eleven punch; twelve punch. (C) 610.10-1994w

zero-sequence impedance (1) (power and distribution transformers) An impedance voltage measured between a set of primary terminals and one or more sets of secondary terminals when a single-phase voltage source is applied between the three primary terminals connected together and the primary neutral, with the secondary line terminals shorted together and connected to their neutral. *Note:* (if one exists).

1) For two-winding transformers, the other winding is short-circuited. For multiwinding transformers, several tests are required, and the zero-sequence impedance characteristics are represented by an impedance network.

2) In some transformers, the test must be made at a voltage lower than that required to circulate rated current in order to avoid magnetic core saturation or to avoid excessive current in other windings.

3) Zero-sequence impedances are usually expressed in per unit or percent on a suitable voltage and kVA base.

(PE/TR) C57.12.80-1978r

(2) (rotating machinery) The quotient of the zero-sequence component of the voltage, assumed to be sinusoidal, supplied to a synchronous machine, and the zero-sequence component of the current at the same frequency. *See also:* direct-axis synchronous reactance. (PE) [9]

zero-sequence reactance (rotating machinery) The ratio of the fundamental component of reactive armature voltage, due to the fundamental zero-sequence component of armature current, to this component at rated frequency, the machine running at rated speed. *Note:* Unless otherwise specified, the value of zero-sequence reactance will be that corresponding to a zero-sequence current equal to rated armature current. *See also:* direct-axis synchronous reactance. (PE) [9]

zero-sequence resistance The ratio of the fundamental in-phase component of armature voltage, resulting from fundamental zero-sequence current, to this component of current at rated frequency. (EEC/PE) [119]

ZERO shift error Error measured by the difference in deflection as between an initial position of the pointer, such as at zero, and the deflection after the instrument has remained deflected upscale for an extended length of time, expressed as a percentage of the end-scale deflection. *See also:* moving element. (EEC/AII) [102]

zero span (spectrum analyzer) A mode of operation in which the frequency span is reduced to zero. (IM) 748-1979w

0-state The logic state represented by the binary number 0 and usually standing for an inactive or false logic condition. (GSD) 91-1984r

zero structure *See:* snub structure.

zero-subcarrier chromaticity (color television) The chromaticity that is intended to be displayed when the subcarrier amplitude is zero. *Note:* This chromaticity is also known as reference white for the display. (BT/AV) 201-1979w

zero suppression (1) The elimination of nonsignificant zeros in a numeral. (C) [20], [85]

(2) (mathematics of computing) The elimination of zeros that have no significance or use, such as zeros to the left of the integral part of a numeral or zeros to the right of the fractional part. *Synonyms:* zero elimination; zero compression. (C) 1084-1986w

zero-suppression character (data management) A character within a picture specification that represents a decimal digit in which a blank character is used in place of a zero. *Note:* Z, Y, and * are commonly used. (C) 610.5-1990w

zero synchronization (numerically controlled machines) A technique that permits automatic recovery of a precise position after the machine axis has been approximately positioned by manual control. (IA) [61]

zero vector A vector whose magnitude is zero. (Std100) 270-1966w

zero voltage fired (electrical heating applications to melting furnaces and forehearth in the glass industry) A circuit in which antiparallel connected thyristors are fired at points of voltage zero in the alternating current voltage wave. (IA) 668-1987w

0x A numerical prefix indicating that the number following is a hexadecimal number. (PE/SUB) 1379-1997

0.0.x talker An application at a node that transmits a stream packet. (C/MM) 1394a-2000

0.0.x terabyte A quantity of data equal to 2^{40} , or 1099511627776, bytes. (C/MM) 1394a-2000

0.0.x transaction A request and the optional, corresponding response. (C/MM) 1394a-2000

0.0.x transaction layer The Serial Bus protocol layer that defines a request-response protocol for read, write, and lock operations. (C/MM) 1394a-2000

0.0.x transmitting port Any port transmitting clocked data or an arbitration state. A transmitting port is further characterized as either originating or repeating. (C/MM) 1394a-2000

0.0.x unit A component of a Serial Bus node that provides processing, memory, input/output (I/O), or some other functionality. Once the node is initialized, the unit provides a Command and Status Register (CSR) interface. A node may have multiple units, which normally operate independently of each other. (C/MM) 1394a-2000

0.0.x unit architecture The specification document that describes the interface to, and the behaviors of, a unit implemented within a node. (C/MM) 1394a-2000

zeta potential *See:* electrokinetic potential.

Z-fold paper *See:* continuous form.

zigzag connection (power and distribution transformers) A polyphase transformer with Y-connected windings, each one of which is made up of parts in which phase-displaced voltages are induced. (PE/TR) C57.12.80-1978r

zig-zag connection of polyphase circuits (zig-zag or interconnected star) The connection in star of polyphase windings, each branch of which is made up of windings that generate phase-displaced voltage. *See also:* connections of polyphase circuits; polyphase circuit. (PE) [9], [84]

zig-zag fold paper *See:* continuous form.

zig-zag leakage flux The high-order harmonic air-gap flux attributable to the location of the coil sides in discrete slots. *See also:* stator; rotor. (PE) [9]

Z marker *See:* zone marker.

z-marker beacon *See:* zone marker beacon.

Zobel filters A filter designed according to image parameter techniques. (CAS) [13]

zonal-cavity interreflectance method (illuminating engineering) A procedure for calculating coefficients of utilization, wall luminance coefficients, and ceiling cavity luminance coefficients taking into consideration the luminaire intensity distribution, room size and shape (cavity ratio concepts), and

room reflectances. It is based on flux transfer theory.

(EEC/IE) [126]

zonal constant (illuminating engineering) A factor by which the mean intensity emitted by a source of light in a given angular zone is multiplied to obtain the lumens in the zone.

(EEC/IE) [126]

zonal factor interflexion method[†] (illuminating engineering)

A procedure for calculating coefficients of utilization based on integral equations which takes into consideration the ultimate disposition of luminous flux from every 10 degree zone from luminaires. (This term is retained for reference and literature searches).

(EEC/IE) [126]

[†] Obsolete.

zonal factor method (illuminating engineering) A procedure for predetermining, from typical luminaire photometric data in discrete angular zones, the proportion of luminaire output which would be incident initially (without interreflections) on the work-plane, ceiling, walls, and floor of a room.

(EEC/IE) [126]

zone See: reach.

zone comparison protection A form of pilot protection in which the response of fault-detector relays, adjusted to have a zone of response commensurate with the protected line section, is compared at each line terminal to determine whether a fault exists within the protected line section.

(SWG/PE) C37.100-1981s

zoned antenna A lens or reflector antenna having various portions (called zones or steps) that form a discontinuous surface such that a desired phase distribution of the aperture illumination is achieved. *Synonym*: stepped antenna.

(AP/ANT) 145-1993

zoned decimal data (data management) Integer data in which each decimal digit occupies one byte, the first four bits of which is called the zone portion and the second four bits, the data portion. The zone portion of the lowest-order byte contains the sign of the integer (hexadecimal A, C, E, or F for positive; B or D for negative); otherwise the zone portion contains the binary value 1111.

decimal	75 ₁₀
zoned decimal	0000 0111 1111 0101 ₂
decimal	-91 ₁₀
zoned decimal	0000 1001 1011 0001 ₂

Synonym: unpacked decimal data. (C) 610.5-1990w

zone leveling (semiconductor processing) The passage of one or more molten zones along a semiconductor body for the purpose of uniformly distributing impurities throughout the material. *See also*: semiconductor device.

(Std100) 102-1957w

zone marker (electronic navigation) A marker used to define a position above a radio range station. *Synonym*: Z marker.

(AES/RS/GCS) 686-1982s, 172-1983w

zone marker beacon (navigation aids) A vertical beam—horizontal cross section in the shape of a circle. *Synonym*: z-marker beacon.

(AES/GCS) 172-1983w

zone of influence An area around a ground electrode bounded by points of specified equal potential resulting from the voltage drop through the earth between the ground electrode and remote earth.

(PE/PSC) 367-1996

zone of protection (1) The adjacent space provided by a grounded air terminal, mast, or overhead ground wire that is protected against most direct lightning strikes.

(PE/EDPG) 665-1995

(2) (for relays) That segment of a power system in which the occurrence of assigned abnormal conditions should cause the protective relay system to operate.

(SWG/PE) C37.100-1992

zone of silence (navigation aids) A local region in which the signals of a given radio transmitter cannot be received satisfactorily.

(AES/GCS) 172-1983w

Zone 1 Terminology used for classification of an industrial area in which an explosive atmosphere is likely to exist under normal operation.

(IA) 515-1997

zone-plate lens antenna See: Fresnel lens antenna.

zone punch (1) A punch in the 0, 11, or 12 row on a Hollerith punched card.

(C) [20]

(2) A punch (2) in one of the upper three rows (0, 11, 12) of a twelve-row punch card. *Contrast*: digit punch. *See also*: eleven punch; zero punch; twelve punch.

(C) 610.10-1994w

zone purification (semiconductor processing) The passage of one or more molten zones along a semiconductor for the purpose of reducing the impurity concentration of part of the ingot. *See also*: semiconductor device.

(Std100) 102-1957w

zone selective interlocking A function provided for rapid clearing while retaining coordination. The function is a communication interconnection between the electronic trip units of two or more circuit-breakers connected in series on multiple levels. By means of intercommunication between the short-time delay and/or ground fault elements, the one nearest the fault trips with minimum time delay while signaling the supply-side circuit-breaker(s) to delay for a predetermined period.

(IA/PSP) 1015-1997

Zone 2 Terminology used for classification of an industrial area in which an explosive atmosphere is not likely to occur in normal operation, and if it does, it will exist only for a short period.

(IA) 515-1997

Zone 0 Terminology used for classification of an industrial area in which an explosive atmosphere is present continuously, or present for long periods of time during normal operation.

(IA) 515-1997

zoning (1) (electrical heating systems) A division of circuits to minimize different conditions in any one circuit, so the temperature at the location of a sensor is typical for the complete circuit.

(IA/PC) 844-1991

(2) (lens or reflector) The displacement of various portions (called zones or steps) of the lens or surface of the reflector so that the resulting phase front in the near field remains unchanged. *See also*: antenna.

(AP/ANT) [35]

zoom (computer graphics) To display all or part of a graphical display image at a scale different from the scale of the previous image. *Note*: In zoom in, the scale is larger; in zoom out, the scale is smaller.

(C) 610.6-1991w

z-position register A register in a display controller which simulates the beam position (on the display) in the z-direction. *Note*: The z-axis represents depth into and out of the display screen. This illusion is achieved by varying the intensity, or color, of the z-vector in proportion to the value of the z-coordinate.

(C) 610.10-1994w

Z_{stub} Characteristic impedance of signal line stub on the module.

(C/BA) 896.2-1991w

z transform, advanced See: advanced z transform.

z transform, delayed See: delayed z transform.

z transform, modified See: modified z transform.

z transform, one-sided See: one-sided z transform.

z transform, two-sided See: two-sided z transform.

Z₀ Characteristic impedance of signal lines, without including connector vias, on the unpopulated backplane.

(C/BA) 896.2-1991w

Z₀' Characteristic impedance of signal lines on backplane populated by male connectors, without termination resistors and with no modules inserted.

(C/BA) 896.2-1991w