

COMPREHENSIVE
DICTIONARY

OF

**ELECTRICAL
ENGINEERING**

EDITOR-IN-CHIEF

Phillip A. Laplante



CRC PRESS



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A CRC Handbook Published in Cooperation with IEEE Press

AMD EX1035

U.S. Patent No. 6,239,614

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Cover Design: *Jonathan Pennell*

Library of Congress Cataloging-in-Publication Data

Comprehensive dictionary of electrical engineering / Phillip Laplante, editor-in-chief.

p. cm.

Includes bibliographical references (p.).

ISBN 0-8493-3128-5 (alk. paper)

ISBN 3-540-64835-6

1. Electric engineering — Dictionaries. I. Laplante, Phillip A.

TK9.C575 1999

621.3'03—dc21

98-44776

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International Standard Book Number 0-8493-3128-5

Library of Congress Card Number 98-44776

Printed in the United States of America 1 2 3 4 5 6 7 8 9 0

Printed on acid-free paper

gain vs. frequency response curve has decreased -3 dB from the passband reference gain. Note that f_1 and f_2 define the response passband by marking the points at which the output power has decreased to one-half the value of the input power. For band widths extending down to DC, the upper -3 dB frequency is cited as the 3 dB bandwidth.

aperture coupling a method of coupling a transmission line to an antenna in which fields leak through an aperture in a metallic ground plane separating the line from the antenna.

aperture efficiency a figure of merit that determines how much of the incident energy is captured by an aperture. It depends on the physical dimensions of the aperture.

APL See average picture level.

APLC See active power line conditioner.

apodization (1) a deliberate variation in the transmission of an optical aperture as a function of distance from the center or edges, in order to control optical transfer functions.

(2) a deliberate variation in the strength of a signal with time.

apparent concurrency within an interval of time more than one process executes on a computer, although at the instruction level, instructions from only one process run at any single point in time. See also concurrency.

apparent power (1) in an AC system, the product of voltage, E and current, I . Apparent power (or total power) is composed of two mutually independent components — an active component (real power), and a reactive component (imaginary power). Apparent power is denoted by S , and has the unit of voltamperes.

(2) the scalar product of the voltage and current delivered to the load. It can also be expressed

as the vector $S = P + jQ$, where P = real power and Q = reactive power.

application-specific integrated circuit (ASIC) an integrated circuit designed for one particular application.

appropriate technology the technology that will accomplish a task adequately given the resources available. Adequacy can be verified by determining that increasing the technological content of the solution results in diminishing gains or increasing costs.

approximate coding a process, defined with respect to exact coding, that deals with irreversible and information-lossy processing of two-level pictures to improve compression ratio with significant degradation of picture quality. Exact coding schemes depend on the ability to predict the color of a pixel or the progression of a contour from line to line. Irreversible processing techniques try to reduce prediction errors by maintaining the continuity of the contours from line to line. With predictive coding the number of pixels can be changed to reduce those having nonzero prediction error. With block coding the compression efficiency can be improved by increasing the probability of occurrence of the all zero block. The third approximate block coding scheme is pattern matching. In this scheme the identification codes of the repeated patterns are transmitted to the receiver. A library of patterns is maintained for continuous checking. See also exact coding.

approximate reasoning an inference procedure used to derive conclusions from a set of fuzzy if-then rules and some conditions (facts). The most used approximate reasoning methods are based on the generalized modus ponens. See also fuzzy if-then rule, generalized modus ponens, linguistic variable.

approximately controllable system an

the service quality temporarily downgrades and, in analogue systems, is noticeable as clicking.

climbers two metal spikes, each of which is strapped to the inside of a line worker's legs, pointing down near the ankle. Plunged into the sides of a wooden utility pole, they provide purchase for the worker to scale the pole.

clipping nonlinear distortion that occurs when the input to an amplifier exceeds the amplifier's linear range. The amplifier output saturates at its limit, giving a "clipped" appearance to the output waveform.

clock (1) the oscillator circuit that generates a periodic synchronization signal.

(2) a circuit that produces a series of electrical pulses at regular intervals that can be used for timing or synchronization purposes.

clock cycle one complete event of a synchronous system's timer, including both the high and low periods.

clock doubling a technique in which the processor operates internally at double the external clock frequency.

clock duty cycle the percentage of time that the electronic signal remains in the true or 1 state.

clock pulse a digital signal that, via its rising edge or falling edge, triggers a digital circuit. Flip-flops and counters typically require clock pulses to change state.

clock recovery in synchronous systems, the act of extracting the system clock signal from the received sequence of information symbols. *See also* symbol synchronization.

clock replacement algorithm a page replacement algorithm described as follows: A circular list of page entries corresponding to the pages in

the memory is formed. Each entry has a use bit which is set to a 1 when the corresponding page has been referenced. A pointer identifies a page entry. If the use bit of the page entry is set to a 1, the use bit is reset to a 0 and the pointer advances to the next entry. The process is repeated until an entry is found with its use bit already reset, which identifies the page to be replaced. The pointer advances to the next page entry for the next occasion that the algorithm is required. The word "clock" comes from viewing the pointer as an arm of a clock. Also known as a first-in-not-used-first-out replacement algorithm.

clock skew the phenomenon where different parts of the circuit receive the same state of clock signal at different times because it travels in wires with different lengths. This skew of the signals causes a processing element to generate an erroneous output. Distribution of the clock by means of optical fibers, waveguides, a lens, or a hologram, eliminates clock skew.

clock speed the rate at which the timing circuit in a synchronous system generates timing events.

closed convex set a set of vectors C such that of $x, y \in C$ then $\lambda x + (1 - \lambda)y \in C$ for all $0 \leq \lambda \leq 1$.

closed kinematic chain in vision engineering, a sequence of links which forms a loop.

closed-loop control control action achieved by a closed feedback loop, i.e., by measuring the degree to which actual system response conforms to desired system response and applying the difference to the system input to drive the system into conformance.

closed-loop DC motor acceleration the use of sensors to provide feedback to the motor control circuit indicating the motor is actually accelerating before the starting resistors are removed from the armature circuit. Two popular methods

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