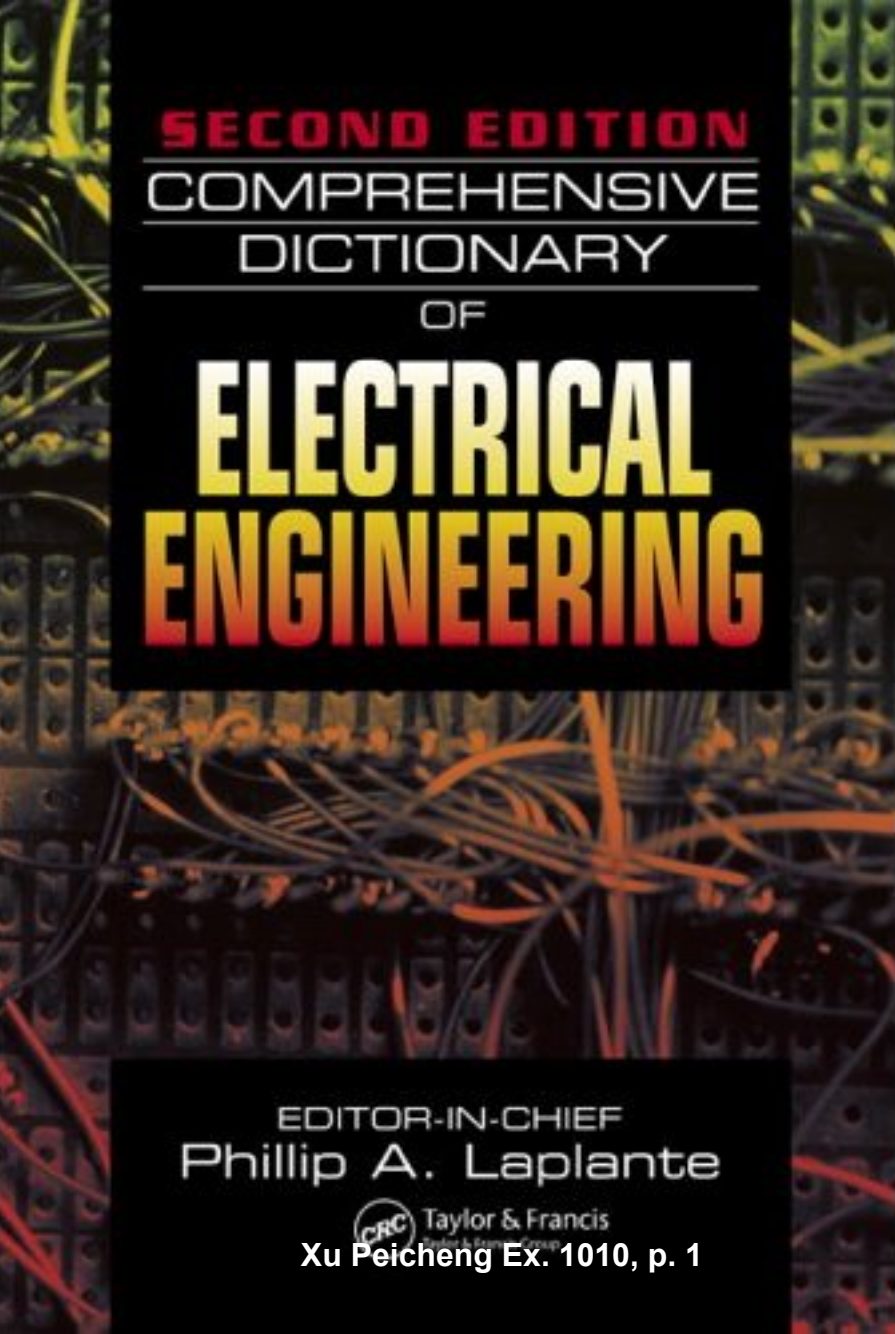




SECOND EDITION
COMPREHENSIVE
DICTIONARY
OF

ELECTRICAL
ENGINEERING

EDITOR-IN-CHIEF
Phillip A. Laplante



Taylor & Francis

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substation battery a battery used to provide operating energy for the protective relay operations and to initiate circuit breaker operations in a generating substation. The battery is necessary, as the equipment must work reliably during severe voltage sags and outages on the AC system.

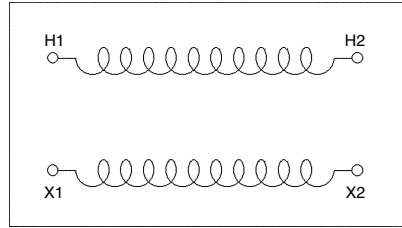
substrate a dielectric or semiconductor slab over which active devices, planar transmission lines, and circuit components are fabricated. This can be a PCB, a ceramic, or a silicon or other semiconductor wafer that has electronic components interconnected to perform a circuit function. *See also* [wafer](#).

subsynchronous resonance an electric power system condition where the electric network exchanges energy with a turbine generator at one or more of the natural frequencies of the combined system below the synchronous frequency of the system.

subthreshold the range of gate biases corresponding to the “off” condition of the MOSFET. In this regime, the MOSFET is not perfectly “off” but conducts a leakage current that must be controlled to avoid circuit errors and power consumption.

subtractor a circuit that subtracts two values.

subtractive polarity polarity designation of a transformer in which terminals of the same polarity on the low- and high-voltage coils are physically opposite each other on the transformer casing. With subtractive polarity, a short between two adjacent terminals results in the difference of the two coil voltages appearing between the remaining terminals. Subtractive polarity is generally used on transformers larger than 500 kVA and higher than 34.5 kV. Smaller units use additive polarity. *See also* [additive polarity](#).



Transformer with subtractive polarity.

subtransient current the fault current that flows during the subtransient period when the generator and motor apparent impedances are their respective subtransient impedances.

subtransient impedance the series impedance that a generator or motor exhibits during the subtransient period, typically the first few cycles of a fault. Subtransient impedances are generally used in calculating fault currents for determining instantaneous relay settings.

subtransient open-circuit time constant *See* [quadrature-axis open-circuit time constant](#) and [direct-axis subtransient open-circuit time constant](#).

subtransmission the circuits which connect bulk power substations to distribution substations.

subway transformer another name for a submersible transformer.

sub-critical the state of a fission chain reaction which is not self-sustaining because an insufficient number of neutrons are produced at each fission.

successive approximation an A/D conversion process that systematically evaluates the analog signal in n steps that produce an n -bit code. The analog signal is successively compared to determine the digital code, beginning with the determination of the most significant bit of the code.