
Electrical & Computer Engineering

SEMINAR

Louisiana State University

Energy Flow and Power Phenomena in Electrical Circuits: Illusions and Reality

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Abstract—Common opinions respective to the nature of the reactive power, energy flow and oscillations, as well as the notion of the apparent power in single- and in three-phase systems are discussed. It is shown that some interpretations of powers and energy flow in linear, single-phase circuits are often generalized for more complex situations where these interpretations are no longer valid. Consequently, power phenomena in electrical systems are often misinterpreted. This relates to the reactive power which occurs in three-phase systems without energy oscillation between the supply source and the load, as well as it occurs in time-variant systems without energy storage capability. Also, it was demonstrated in the paper that the arithmetic and geometric apparent powers, commonly used in three-phase systems, do not characterize the supply loading correctly when the load is unbalanced.

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