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Instantaneous Energy and Power in Nonsinusoidal conditions.

One of the main features of the modern power systems is application of a large unity power loads with non-linear characteristics. Such installations made significant voltage and current forms distortions. In spite of that the more precise measurements of power/energy in billing purposes must be made. There are no problems in active power measurements. But precise reactive power measurements have essential problems due to the lack of generally accepted power/energy components definitions for nonsinusoidal conditions. This paper presents new instantaneous active, reactive and switch power/energy components definitions. It is shown that instantaneous power can be exposed as sum of active and passive components. In general case passive components can be exposed as the sum of switch, reactive inductive and reactive capacitive components. It is established that there are interrelations between active and passive current and voltage components in the nodes, contours and the whole circuit. It is shown that for instantaneous active and passive power/energy components there are proper balances in the nodes, contours and the whole net.

Key-words: instantaneous energy and power, nonsinusoidal, current and voltage components, power and energy components definitions, switch, reactive inductive, reactive capacitive components, active and passive power/energy components balances.

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