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DETERMINATION OF THE OSCILLATING POWER IN ASYMMETRICAL NON-SINUSOIDAL MODES OF ELECTRIC NETWORKS

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Abstract

The paper considers electro-technological installation electricity network. Voltage source contains the basic, fifth and seventh harmonic components of voltage with simultaneous unsymmetry of one phase, and loading is the source of current with the indicated harmonic components. The components of instantaneous power from unsymmetry are determined as instantaneous conditional powers of reverse sequence. These powers are of non-sinusoidal character that testifies to mutual impact of the all harmonic components from different sequences. Pulsating power is written in through the sum of powers predetermined by unsymmetry and non-sinusoidal character. Component powers of reverse sequence and power of harmonic distortions are determined by integration of corresponding instantaneous powers on the period of T supply voltage. The pulsations levels of active and reactive powers are appraised according to the root-mean-squares of pulsation powers. The pulsations level of component powers from loading unsymmetry is appraised by means of root-mean-squares of reverse sequence conditional powers. Components of distortion complex power are determined by integration of the distinguished sixth harmonic component of instantaneous powers for distortion in the period of T supply voltage. From the other side the complex values of distortion powers are determined as vectorial product of vectors of tension complex and separate sequences currents. Exactness of powers determination depends on taking into account the tension and reverse sequence current. Analysis of components vibrations for active and reactive powers, predefined by non-sinusoidal character, showed the presence of component powers of the twelfth harmonic component. Their level does not exceed 1% powers of the sixth harmonic component that is why its influence is possible to be ignored. Offered dividing of pulsating power into two components gives an opportunity to define reasons of indexes worsening of electric power quality in case of the asymmetrical non-sinusoidal loading composition. References 20, figures 3.

Key words: electrical networks, asymmetric sinusoidal mode, the definition of a oscillating power.

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