Expoziția Internațională Specializată
INFOINVENT 2023

1948
UNIVERSITATEA DIN
PETROȘANI

METHOD OF OPERATIONAL CONTROL OF SYMMETRICAL COMPONENTS IN THREE-PHASE ELECTRICAL POWER SYSTEMS

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OSIM 130884/2017

ABSTRACT

NOVELTY - The invention relates to a method for operative control of the symmetrical voltage or current components within three-phase electromagnetic systems in sinusoidal regime, which can be implemented in electronic relays specific to protection subsystems operating according to numerical principles. According to the invention, the method consists in determining the dissymmetry degree and asymmetry degree a by taking voltage samples corresponding to the moment of time t1, then, after a time interval t=6.6 ms, taking the voltage samples corresponding to the moment of time t2 and, after another time interval t=6.6 ms, taking the voltage samples corresponding to the moment of time t3, the numerical equivalent of these samples being processed by a numerical relay which is specially designed for the claimed method and may make a decision for acting, the sooner after a time interval Tp= 2 t from taking the first set of samples, if the indicators or exceed the values set by the specific electric energy quality norms, the control method operating based on an algorithm which can be used in designing a numerical relay or can be converted into a software corresponding to the programming environment used by a computer.

KEYWORDS

Digital Computers,
Switchgear,
Protection,
Electric drives
Electronic relays

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INTRODUCTION

The problem that the invention solves is the location of thermoelectric technological equipment, underground, at the quota and in the area of the exploitable mining field, which is supplied with coal by horizontal and/or gravimetric transport and which ensures the preparation (granulation and separation from the waste) of coal for combustion even underground, at the site of extraction of coal from the abattoir, which allows the full recovery of methane from coal exploited, transported and ground, to be injected into the thermoelectric power plant, significantly improving the energy efficiency of coal and transferring electricity directly through cables and heat through pipelines to the surface, with combustion residues to be stored directly underground in the operated premises, reducing the risk of explosion caused by the air-methane-dust mixture of coal and eliminating environmental pollution from the surface of the exploited space.

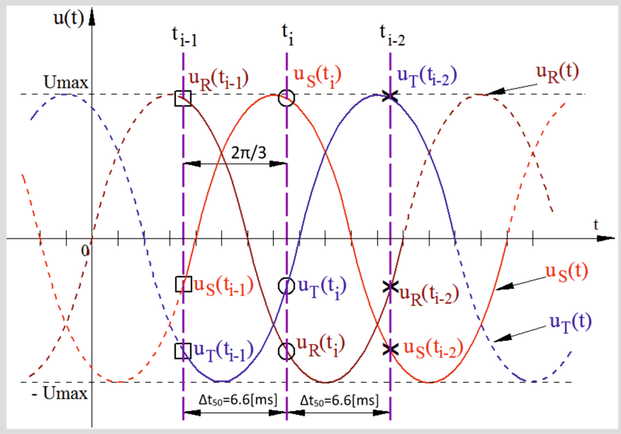

Figure 1. Sampling of triphasic voltage signals

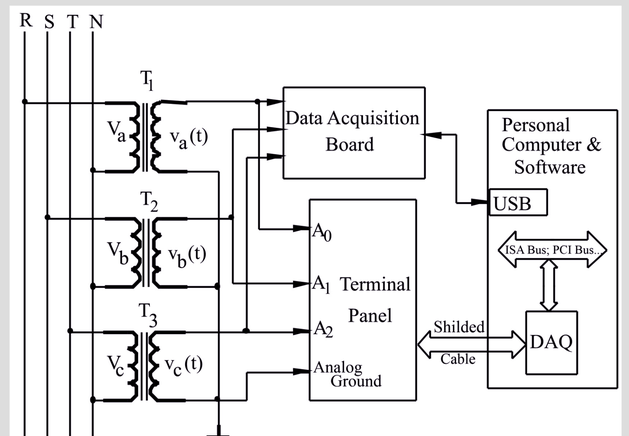

Figure 2. Scheme of principle of the system of operational control of symmetrical components

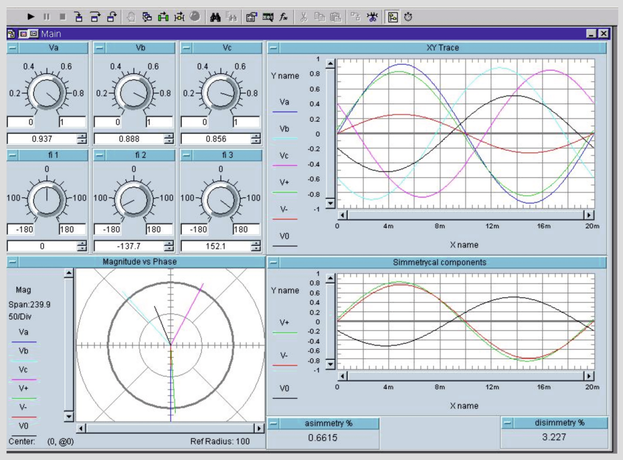

Figure 3. Graphic program for the operational control of symmetrical components in triphasic systems

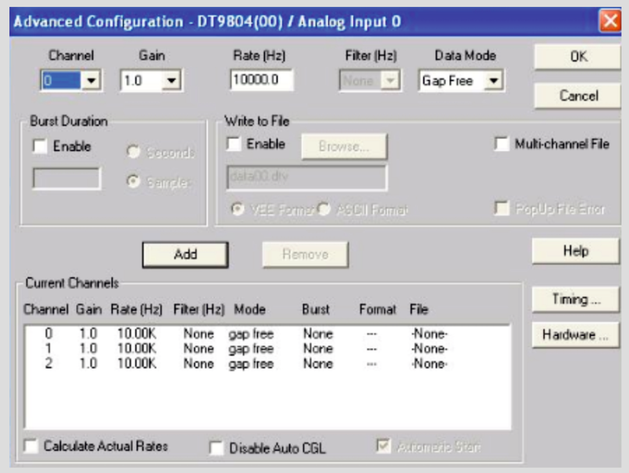

Figure 4. Configure the data acquisition system used in app testing

RESULTS

The invention refers to a method of operational control of symmetrical voltage (or current) components of triphasic sinusoidal electroenergy systems, which can be implemented in electronic relays specific to protection subsystems, which operate on numerical principles.

The method of operational control of symmetrical components of triphasic sinusoidal electroenergy systems, according to the invention, is based on an ultrafast processing of voltage information, using a set of nine samples obtained at equal intervals (6.6ms). On the basis of the operative control method, a microprogrammable subsystem can be constructed to take samples from the voltage information, process them according to an algorithm specially designed for the symmetric component relay and make decisions about the degree of dissymmetry and asymmetry of the system, these values can be displayed.

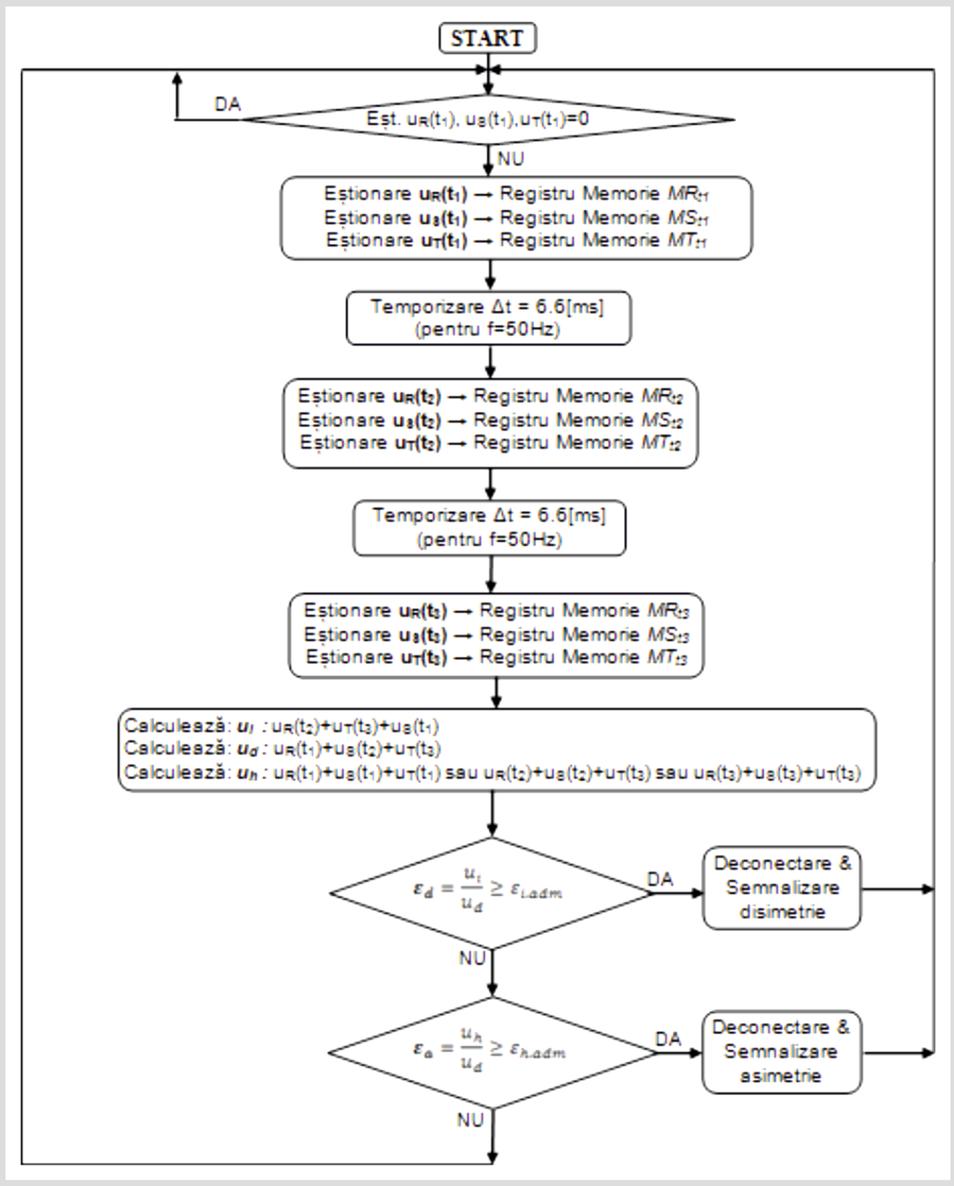

Figure 5. Algoritmul de funcţionare a releului operativ al componentelor simetrice