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APPLICATION OF A NEW NEURAL NETWORK FOR EVALUATION OF CRITICAL POINT IN POWER SYSTEM TRANSIENT STABILITY*

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ABSTRACT

The direct energy function method, based on the evaluation of energy function of Controlling Unstable Equilibrium Point, CUEP, is briefly explained. Application of the use of CUEP, to determine transient stability of a multimachine power system and its computing difficulties for on line security assessment, are discussed and an estimating neural network PNN is introduced. This neural network, which is a general estimator, can be used regardless of non linearity, time variance or other characteristics of system dynamics. This neural network is suggested for evaluation of the system critical point to determine the transient stability of the power system.



IDENTIFICATION OF SYNCHRONOUS GENERATOR PARAMETERS UNDER OPERATING CONDITION**

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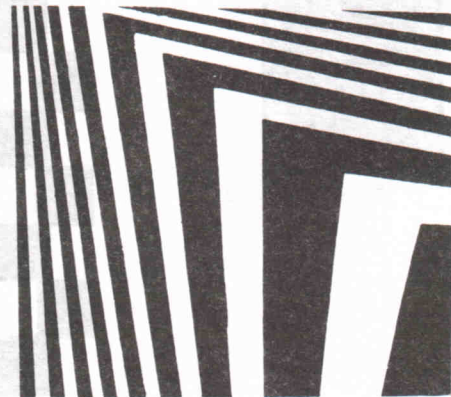
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ABSTRACT

Synchronous - machine stability - constant determination has become a topic of considerable research interest by the power utility industry, mainly due to the increasing demand for more accurate performance evaluation of electric generators, and other components of the power system networks, to ensure stability and reliable operation of the system. Manufacturers normally determine these parameters by standard factory tests that are based on design data and physical characteristics. These parameters vary in time and do not reflect the actual parameters of the machine under operating conditions. In this paper a time domain approach is proposed to determine the dynamic parameters of the synchronous - machine, directly from input - output data measured at the terminals of the machine, while operating under normal conditions. The paper is divided into two sections. In the first section, parameters of a simulated generator are identified by applying a small pulse disturbance to the set point of AVR and the results compared with those of the simulated generator. In simulation of a generator, the rotor circuit is modeled by four windings and the generator is connected to an infinite busbar through a transmission line. Prediction Error Method has been used for identification. In the second part, instrumentation for a laboratory test is explained. Voltages, currents and the rotor angle of a generator are transmitted to a signal conditioning set and after scaling, filtering and isolation, digitized and stored in the computer for future processing.

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ABSTRACT

The design of a low inductance spark gap suitable for triggering lasers, using circuit boards as transmission lines, is presented. This spark gap is highly reliable for repetitive switching, and it is capable of delivering high voltage and current in the triggering operation. The switch performance has been studied in a nitrogen laser driven by a Blumlein circuit, and the preliminary results are reported. When operated at a rate of 10 pps the switch provided reproducible pulse waveforms without maintenance for a total of 10^8 laser shots.

EFFECT OF INOCULATION ON MICROSTRUCTURE AND PROPERTIES OF LOW C-MN AND LOW ALLOY STEELS*

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ABSTRACT

Effect of the addition of various inoculants on the morphology and mechanical properties of low C-Mn and low alloy steel samples is studied by thermal and mechanical processing of the samples after solidification. According to the results obtained from metallographic studies with the electron microscope and microanalysis with X-rays, the distribution of inoculating agents in the steel matrix is seen in the form of very fine precipitates dispersed in the austenite - ferrite microstructure. These precipitates retard low -

temperature recrystallization of austenite, increase the specific boundary area of retained grains and enhance concentration of more favored nucleation sites when austenite to ferrite transformation occurs at the final cooling stage from normalization temperature and thus cause a recognizable refinement in the steel microstructure. Both the strength and hardness of the samples are considerably enhanced by increasing the content of the inoculating agents, while the decrease in the elongation of the samples is limited to an acceptable range.

A MICROPROCESSOR - BASED MULTILoop PID CONTROLLER*

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ABSTRACT

Most industrial systems, in order to establish desirable behavior, use controllers. Analog controllers, due to the fixed nature of electronic circuits and the problem of fine tuning of the feedback systems, result in a control medium that can not easily have its function changed. This has led to the use of digital controllers where we have greater flexibility of parameter changing in a broad range and the ability to interact with the other systems.

In this paper, the theory and the hardware and software design process of an 8 bit, microprocessor based, 4 loop PID controller, with different sampling rates, will be described. To represent the PID algorithm in digital domain, the tustin approach with parallel state space realization was used and all the computations done in floating point arithmetic.

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* Submitted to IEEE Transaction on Industrial Electronics.

ABSTRACTS OF PAPERS PRESENTED AT INTERNATIONAL CONFERENCES

The abstracts of papers published in this magazine pertain to research projects conducted all over I.R. Iran, including those papers which have been printed previously in reputable scientific publications, and are not limited to the Sharif University of Technology. The Editor would be happy to include abstracts, in future editions of all scientific papers presented by researchers throughout the country, with a view to keeping the academia and professionals informed about research activities carried out by Iranian scientists.



BALANCED TERNARY DESIGNS WITH BLOCK SIZE FOUR*

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ABSTRACT

A balanced ternary design with block size four is a

collection of multi-sets of size four, chosen from a v -set in such a way that each element of the v -set occurs 0, 1 or 2 times in each of the multi-sets (which are called blocks). Also each distinct pair of elements occurs λ times (λ is the index) and each element is repeated (that is, occurs twice) in ρ_2 blocks. (Here, a block such as $\{a, a, b, c\}$, written $aabc$ for short, is said to contain six pairs: aa and bc once each, and ab and ac twice each.)

In this paper we give necessary and sufficient conditions for the existence of a balanced ternary design with block size 4, any index λ , and $\rho_2 \leq 6$.



RELIABLE SPARK GAP SWITCH FOR LASER TRIGGERING*

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* Published in *Rev. Sci. Instrum.* 63, 12 (1992).