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FE Harmonic Distortion Factor Analysis of Output Voltage of Synchronous Generator Using Moving Band Technique

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Abstract

In this paper a two-dimensional finite-element modeling is used for analyzing harmonic distortion factor (HDF) of the output voltage and consideration is given to rotor movement. Moving-band technique is used for treatment of the motion of the rotor. The harmonic balance system of algebraic equations has been straightforwardly derived by applying the Galerkin approach to both the space and time discretization. The proposed method has been applied for calculating the distortion factor of the output voltage waveform in a 400V, 160-kW salient pole synchronous generator. The computed value has been found consistent with experimental results. The proposed technique is quite useful for optimum design of the pole shape for the maximum acceptable limit of voltage waveform distortion factor.

Keywords: Discrete Fourier transform, finite-element method (FEM), harmonic distortion factor (HDF), moving band technique, salient pole generator.

Comparative Analysis of DSP Transforms

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Abstract

Digital Signal Processing (DSP) is one of the emerging and recently developed tools, being frequently applied in different areas of engineering and technology. Its applications in real time controls have seen a rapid change with the help of high speed and incredible capabilities of computers and Application Specific Integrated Circuits (ASIC) DSP chips. General purpose CPUs have made inroads into many signal processing applications due to the rapid growth in computer technology. Out of the several tools, the Fast Fourier Transform (FFT) continues to play an important role. A large number of FFT algorithms have been developed over the years, notably Radix-2, Radix-4, Split-Radix, Fast Hartley Transform (FHT), Quick Fourier Transform (QFT) etc [1-3]. Performance comparison of these algorithms is of considerable interest to developers of signal processing technology. The authors, in this paper, have presented a comparative performance analysis of these algorithms by applying them in general purpose processors. The performance analysis of each of these algorithms is based on four factors namely, (i) number of mathematical operations, (ii) computation time, (iii) memory requirements, and (iv) structural regularity.

Keywords: FFT, QFT, DFT, FHT, DCT, DST, Computational Speed, Memory Usage.

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Journal Motion Simulation of Hybrid Journal Bearing considering Viscosity variation due to Temperature Change

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Abstract

A journal bearing system, if journal is disturbed from its equilibrium position, experiences change in the hydrodynamic forces acting on it. This disturbs the equilibrium of the journal and makes its center to whirl around the static equilibrium position. The dynamic response of a journal bearing system under these conditions can be obtained using either linear or non-linear equation of journal motion. The present work is aimed to determine realistic dynamic response of hole-entry hybrid journal bearing system compensated with constant flow valve restrictor. In this paper, the nonlinearized dynamic response of the journal bearing system is studied by considering. two cases of journal mass (M_J) with respect to critical mass ($\overline{M}_c^l$) obtained from linear analysis. i.e $\overline{M}_J = \overline{M}_c^l$ and $\overline{M}_J > \overline{M}_c^l$. The deviation in stability margins is established by comparing the results obtained from the linearized and nonlinearized stability analysis for each case namely, isothermal, elastohyrdostatic, thermohydroststic and thermoelastohydrostatic. The coupled solution of Reynoldôs, energy, conduction and elasticity equations is obtained using finite element method and the equation of motion is computed using fourth order Runga-Kutta method. The results obtained in the present work for nonlinear dynamic analysis of a constant flow valve compensated hole-entry hybrid journal bearing shows a increase in stability margin as compared to linear analysis for a case when isothermal conditions are assumed and bearing is considered rigid. When variation of viscosity with temperature is considered i.e. THS case, the stability margin is found to be about 20% higher than that estimated by linear analysis.

Keywords: Thermal effects, hybrid bearings, stability, finite element method.

SIMULINK Based Simulation of TCSC in Single Machine Infinite Bus System

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Abstract

Power system engineers are currently facing challenges to increase the power transfer capabilities of existing transmission system. Flexible AC Transmission System (FACTS) controllers can balance the power flow during transient states by enhancing the transient stability limits of the power system and hence using the existing power system network most efficiently. Because of their fast response FACTS controllers can very effectively improve the stability of an electrical power system by helping critically disturbed generators to give away the excess energy gained through acceleration during fault [1]. Thyristor Controlled Series Compensator (TCSC) is a key FACTS controller and is widely recognized as an effective and economical means to enhance power system stability. Presently the manufacturers of FACTS controllers over the world are, through trial and error methods, trying to develop simulated model before actually manufacturing them. In the present work an attempt has been made to simulate the TCSC by making use of SIMULINK. Analysis of the simulated TCSC shows similar functions as a physical one. The simulated TCSC shows that the oscillations are damped out on increasing the damping coefficient. Change in value of reactance of the TCSC affects the stability of the system.

Keywords: FACTS, Stability, Transient stability, Transient stability limit, Voltage stability, Thermal rating, SMIB system, sub-synchronous resonance (SSR).

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Manpower Retention Strategies - A Study of Ind-Swift Limited

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Abstract

The most challenging job in todayôs business environment is to retain employees for business enterprise. More and more companies are now waking up to the fact that retaining and grooming its existing employees is more beneficial than recruiting afresh. But, because of lack of growth opportunities, lack of promotional avenues, inadequate salary, non-conducive policies and procedures, physical strains and uneasy relationship with peers and managers make the employees to join other organizations. Several strategies like better career and training opportunities, effective communication, better salaries and rewards, good organization culture and better safety measures are being used by the organizations to retain their employees. Every individual is different, his needs, emotions and problems are different. So, HR manager has to align personal goals of employees with the organizational goals so that mutual benefits and understanding keep the organization going.

Present study examines the retention strategies being adopted by one of the leading company in the pharmaceuticals industry i.e. Ind-Swift Ltd.. Suggestions are given for better retention in the organization, so that goals of the organization are achieved.