Abstracts of Papers in English

COMPARATIVE ANALYSIS OF ADSL EQUALIZATION TECHNIQUES

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Abstract

This paper provides an overview of equalization techniques for Discrete MultiTone (DMT) modulation systems, which are used in ADSL modems. ADSL modems are used to provide broadband connectivity to home users using the existing telephone wirelines. Noting the distortions caused by the wireline channel by the wireline channel transfer function, ADSL receivers should use equalizers to compensate the channel effects. Several different techniques have been proposed for the design and implementation of an equalization block in DMT receivers. In this article, we provide an overview of some of the key techniques, report the results of their implementation on a sample standard loop and compare their respective performances. The analyzed and compared equalization methods are: Maximum Shortened SNR, the Divide and Conquer minimization technique, Maximum Geometric SNR and the Eigen approach. Simulation results demonstrate that the eigen approach provides the best performance: This technique can also be implemented with lower complexity compared to MGSNR technique.

DESIGNING PIECEWISE H_∞ CONTROLLERS FOR PIECEWISE AFFINE SYSTEMS

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Abstract

The problem of designing a piecewise linear dynamical controller of the piecewise H_∞ type for a piecewise affine system has been considered. This problem corresponds to a family of H_∞ controller design problems. It has been shown that this set of problems can be cast as a set of convex optimization problems subject to Linear Matrix Inequality constraints that are solvable efficiently using existing software. The closed loop, consisting of the proposed controller and the piecewise affine plant,

is capable of command following; subject to limitations on the energy of the control signal. Conditions may be imposed that insure the continuity of the control input to the plant. Piecewise quadratic Lyapunov functions are used to analyze closed loop stability. Performance is verified through simulation.

ESTIMATION OF NON SINUSOIDAL VOLTAGE EFFECTS ON THE POWER CONSUMPTION OF AN AGGREGATED LOAD ON THE BASIS OF IMPROVED LOAD MODEL

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Key Words: voltage havmonics, modeling, parameter identification, power consumption.

Abstract

The harmonic content of supply voltages increases the power consumption of the loads and imposes economical losses on customers. However, the level of economic effects and also the role of power quality instruments for decreasing power losses are unknown. In this paper, an improved model for aggregated loads is proposed. Based on this model, the effects of voltage harmonics on load power consumption and its economical aspects are investigated. The model parameters are identified by practical means, such as capacitor bank switching or load switching methods. The proposed model is verified by comparison of the simulated and measured results.

SOURCE CODED MODULATION FOR DISCRETE SOURCES WITH MEMORY

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Key Words: joint source-channel coding, discrete source with memory, signal set mapping, MPSK modulation scheme, source coded modulation.

Abstract

For a source with memory, the outputs of the source are not independent and, therefore, previous outputs reveal some information about future ones. These redundancies are hidden in output sequences, and cannot be used for improving the error performance of communication systems. In this paper, we present a new joint source-channel coding scheme for sources with memory, called source coded modulation. Source coded modulation is a scheme in which source characteristics are used to provide error protection, via an appropriate signal assignment, to each symbol of the source. In this scheme, we use the source transition matrix to plot a trellis diagram and, then, we propose an algorithm for mapping a given signal constellation on branches of this diagram, based on source statistical characteristics. Finally, we investigate a method to determine the maximum achievable error protection by using the source redundancy. Simulation results show that the proposed scheme can obtain a robust and error-resistant performance over AWGN channels, proportional to the source redundancy.

INVESTIGATION OF FAULT LOCATION EFFECT ON THE INTER-AREA OSCILLATIONS IN STRESSED POWER SYSTEMS USING MODAL SERIES METHOD

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Key Words: modal interaction, power system dynamic, inter – area oscillations, normal form, modal series.

Abstract

Heavily loaded, stressed power systems exhibit complex dynamic behavior, such as auto and hetero parametric resonances and inter-area oscillations, when subjected to a disturbance. These behaviors cannot be analyzed by conventional linearization based methods. Nonlinear tools, such as normal form and modal series methods, can be utilized for studying and understanding them. In this paper, using a modal series technique, the effect of fault location and duration on the dynamic performance of the stressed power systems is investigated. Three indices are defined and used to explain the effect

of different fault scenarios on the transient behaviors of the system. Also, a qualitative analysis of plant mode and inter-area mode type behaviors are presented and typical differences are highlighted. The numerical simulations on the IEEE 50-generator test system demonstrate the validity of the investigation carried out by the modal series analysis.

A NOVEL CONTROL STRATEGY FOR POWER SYSTEM STABILITY IMPROVEMENT USING FUZZY LOGIC CONTROLLED STATCOM WITH DIFFERENT INPUT SIGNALS

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Abstract
Power systems are changing rapidly because of deregulation, fast demand rising and wide area expansion. Controllability and stability of power systems can be improved by proper use of FACTS devices. STATCOM is one of the parallel FACTS devices that can be used for power system transient, steady state and dynamic stability. In this research, proper control and application of STATCOM is studied for improving power system transient stability. Fuzzy logic is used to overcome the existing uncertainties and complexities of the system. The controller is designed, based on different input signals, and the results are studied by simulation results.

LINEAR DISTINGUISHING ATTACK ON A SIMPLIFIED VERSION OF WG 128

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Abstract
WG is a new synchronous hardware oriented stream cipher, corresponding to Profile 2 of the ECRYPT call for stream cipher primitives. Its key length is variable between 80 and 128 bits. The WG cipher has been designed to produce key stream with guaranteed randomness properties. In this paper we present a linear approximation based distinguishing attack against a simplified version (without Trace Function) of WG 128. Our attack requires 232 output words of key stream generator to distinguish the output of simplified version of WG 128 from a truly random bit sequence.

PERFORMANCE COMPARISON FOR SPECTRAL-BASED DOA ESTIMATION ALGORITHMS AND PROPOSAL OF A HIGH-RESOLUTION AND LOW COMPUTATIONAL COST ALGORITHM

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Abstract
In this study, at first, a comprehensive review on the Spectral-Based direction-of-arrival (DOA) estimation is presented. We consider both the beamforming and subspace methods of Spectral-Based DOA estimation. The performance, sensitivity to SNR, number of elements, number of snapshots and correlated sources, are compared through the use of plots obtained from several simulations. Moreover, the computational costs of different methods are compared. Subsequently, a new method for DOA estimation is proposed, which offers a better resolution for resolving very closely spaced sources and has a low computational burden.