

## THE IMPROVEMENT OF ALL-DIGITAL AMPLITUDE-LOCKED LOOP SEPARATION ANALYSIS COMBINED MIMO SYSTEM

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**ABSTRACT.** *The mobile communication is often interfered by any type of noises. The all digital phase-locked loop (ADPLL) system has been successfully used for decades in order to track the carrier phase of a frequency modulation (FM) signal. In this paper, we combine the ADPLL and the all-digital amplitude-locked loop (ADALL) system structure for modulation signals of the separation co-channel transmission system. It is demonstrated co-channel separation signals from FM system with the results of simulation experiments. The least mean square (LMS) theory is introduced more efficiently to eliminate the noise interference and to separate the multi-channel signals. This paper is also shown and demonstrated the multi-channel signal in FM system which is combined the ADPLL and the ADALL algorithms with an adaptive finite impulse response (FIR) filter. The multi-channel transmission with the additive white Gaussian noise (AWGN) interference has been solved by using the proposed algorithm. The demodulated signals are operated and demodulated by the LMS algorithm. The separation signals of the multi-channel can be obtained the perfect performance and process for high speed and low cost. The proposed system of this paper is the virtue and advantage to implement the communication security field. In general words, it can be substituted and replaced the encryption (or decryption) system.*

**Keywords:** ADPLL, ADALL, FM, FIR, LMS, Communication security, Encryption

**1. Introduction.** Over the last decades, digital communication has become one of the basic technologies for our modern life. Only when using digital transmission, information can be transported with moderate power consumption, high flexibility and especially over long distance, with much higher reliability than by using conventional analog modulation. Thus, the communication world has been going digital [1].

When regarding digital transmission, we have to consider two dominant impairments. Firstly, the signal is corrupted by additive white Gaussian noise environment, which can be thermal noise of the receiver front-end or crosstalk caused by other users transmitting in the same frequency band. Secondly, the transmission media is dispersive. This situation can be described as a linear system with some specific transfer function, where attenuation and phase coefficients are varied with frequency. This property causes the frequency components to be affected differently. The channel transmission signal is distorted for the transmitted pulses in the time domain [2-6].

The ADPLL system has been successfully used for decades in order to track the carrier phase of an FM signal. It is proposed to analysis suppress the in-band interference problem efficiently. The ADPLL demodulated outputs contain large in-band spikes and get some unintelligible turbulence. In this paper, a novel separation algorithm is proposed for canceling co-channel interference (CCI) communication system by the ADALL