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Author: Mr. Yang Yao
University of Electronic Science and Technology of China(UESTC), China

Ms. Weijuan Tu
University of Electronic Science and Technology of China(UESTC), China
Dr. Chengjun Guo
University of Electronic Science and Technology of China(UESTC), China
Ms. Jing He
POWER CHINA Sichuan Electronic Power Engineering Co., LTD., China

A MODULATION RECOGNITION METHOD FOR OFDM BASED ON COMPRESSED SENSING

Abstract

With the growth of the number of mobile users in the world, in order to realize high-quality communication services in any scenario, the integration technology of satellite and ground mobile communication network is developing continuously. However, the satellite channel has the problems of frequency selective fading and the shortage of frequency band resources. As a special multi carrier transmission technology, orthogonal frequency division multiple (OFDM) plays a key role in satellite communication. Satellite communication signal has the characteristics of high frequency and wide bandwidth. In the process of non-cooperative satellite communication signal processing, there are a series of problems, such as the increase of signal sampling rate and the increase of data volume. In order to solve the modulation recognition problem of OFDM, this paper proposes an OFDM modulation recognition method based on compressed sensing. Compressed sensing is a theory of under-sampling signal acquisition and processing. The signal acquisition system based on compressed sensing theory can compress the signal while collecting the signal, and realize the sampling at a rate far lower than Nyquist sampling rate while retaining the vital information. In this paper, the OFDM signal is sparse expressed on the basis of discrete cosine transform, then the random measurement matrix is constructed to down sample the sparse signal. Under the condition of low signal-to-noise ratio, OFDM and other single carrier signals can be distinguished effectively by using the progressive Gaussian property of high-order cumulants of under-sampling OFDM signals. Compared with the traditional high-order cumulant recognition algorithm, the proposed method needs less sampling points to achieve the same recognition rate, which can effectively overcome the problems of high sampling rate and large amount of data in satellite communication signal reconnaissance processing, and it has good anti-noise performance.