

Analysis of digital radio systems based on quantum signal processing

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Abstract:

The ionospheric is a region between 80km and 2000km above the earth. It is also known as region of plasma which means electron and positive ions. The amount of ionization is very high because the Sun's radiation is very strong in this region. So ionospheric effects on digital radio system should be monitored accurately and analyzed to improve the digital radio signals. In ionospheric plasma, function of radiation intensity and scintillation depended on the phase increments which affect the signals in digital radio should be analyzed. In order to implement such a system, potential digital radio system needs efficient signal processing and powerful computations. In this approach, quantum computing [1] and quantum signal processing (QSP) with proper audio coding based on partial unit memory coding (PUM) may be employed [2][3].

Analogue technology has been considered as a traditional radio system, but digital radio system is dominating currently in most of the multimedia applications. Quantum multimedia, computers and systems, are going to be released soon for public in future market. Quantum multimedia systems need quantum radio system which is basically different from digital radio system because binary and quantum bits (qubits). In addition to this, status and properties of these binary and qubits affects signal processing in digital and quantum radio system respectively. In order to improve the signals in digital radio system, these two systems should be compared and analyzed. Overall processing involved with qubits and audio coding based on PUM codes [3] will increase the efficiency of the radio system. In addition to this, joint source and channel coding based on PUM codes will increase the overall efficiency in radio system in many ways. Thus, transmission quality and storage capacity are few of important features. As conclusion, future quantum radio system will be better than digital radio system because ionospheric effects [4] on the radio system used in global navigation satellite system will be monitored accurately and minimized.

Keywords— Digital radio system, quantum signal processing, quantum computing, PUM coding, ionospheric plasma

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