



Abstract

In this paper, a newly multicarrier signaling technique referred to as Orthogonal Time Frequency Space (OTFS) with a radar detection system is presented for the next formation of radar projects, which is called the OTFS-based radar system. As an advantage of the OTFS technique, it uses the delay-Doppler domain as the framework of its application where the delay-Doppler domain is employed widely in radar and communication. The delay-Doppler domain in communication expresses the channel properties, while in radar, it is used to distinguish moving targets by their Doppler (as velocity) and delay (as range) characteristics. Orthogonal Frequency Division Multiplexing (OFDM-) based radar which is named as OFDM-based radar system is another well-known multicarrier candidate that is studied by researchers. The OTFS and OFDM techniques utilize the whole frequency band to obtain the full diversity for radar processing. But, OTFS has better performance in high mobility circumstances, and it requires shorter cyclic prefix (CP) compared to other multicarrier techniques, which enables target tracking and more range in radar. Employing MATLAB as the simulation software, performance of the OTFS-based radar system in communication and radar is achieved and the compared outcomes are extracted in the simulation result section where the superiority of the OTFS-based radar system in different terms is interpreted.