Frequency Domain Extended-MUSIC Algorithm for TOA Estimation in Indoor UWB Radio Impulse Channels

International Journal of Computer Applications
© 2014 by IJCA Journal

Volume 107 - Number 21
Year of Publication: 2014

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10.5120/19139-0019

Abstract

Several indoor localization systems have grown considerably, in order to obtain a high performance in dense multipath propagation channels. Many studies have been done in this area. Different methods have been proposed based on the use of Impulse Radio Ultra Wide band (IR-UWB) signals. These systems are usually based on time of arrival estimation using different algorithms. In this paper, a new time of arrival estimation algorithm is proposed for impulse radio UWB systems, which is based on the EXTENDED-MUSIC algorithm. Furthermore, Simulation results show these performances in multipath channels. The proposed method is compared with other high resolution algorithms such as Multiple SIGNAL Classification (MUSIC), estimation of signal parameters via rotational invariance technique (ESPRIT) and the MATRIX PENCIL method. Simulation will justify the high accuracy and resolution localization capabilities of the proposed algorithm.

References
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Index Terms

Computer Science

Communications

Keywords

Impulse Radio Ultra Wide band (IR-UWB) Time of arrival estimation (TOA)

EXTENDED-MUSIC

ESPRIT

MATRIX PENCIL