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Abstract

Relative Delay estimation is an important issue for asynchronous physical layer network coding (PLNC). In this paper, an fast Fourier transform (FFT) based channel and delay estimation method for asynchronous PLNC is proposed. The extended properties of discrete Fourier transform are exploited to design the pilots, which makes the pilots from different nodes orthogonal in frequency domain. Then channels between relay and different terminal nodes are estimated separately in frequency domain. Finally, after inverse FFT, the relative delay is extracted from the estimated time domain channel information. Compared with the existing approaches, the proposed method can achieve almost the same performance, but with significant improvement in computational complexity.

Keywords: asynchronous physical layer network coding, two way relay, channel estimation, delay estimation.

1. Introduction

. Physical-layer network coding (PLNC) proposed by Zhang, Liew and Lam [1] exploits the network coding operation that occurs when signal wave forms are superimposed on one another to improve spectral efficiency and provide higher throughput in a relaying network. It has been widely used in wireless networks.

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