國立交通大學

電機資訊學院 電信學程

碩 士 論 文

正交分頻多工系統之同步研究

Synchronization for OFDM Systems

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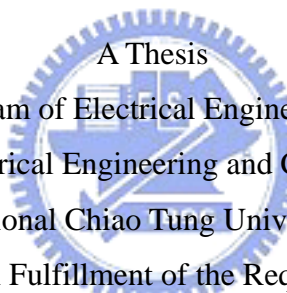# Synchronization for OFDM Systems

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國 立 交 通 大 學

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正交分頻多工系統之同步研究

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摘　　　要

　　正交分頻多工對於在頻率選擇性衰退及多重路徑通道中高速傳輸是一個很有用的調變技術。然而，正交分頻多工對於對同步錯誤極為敏感，些許的載波頻率偏移與符元時序偏移就能造成符際干擾及子載波干擾，導致系統效能變差。

　　在本論文中針對同步問題中的前導信號偵測、頻率偏移估算及碼框同步，提出解決方法，經由數學的推導與電腦模擬系統效能的結果，分析系統的效能。

Synchronization for OFDM Systems

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ABSTRACT

Orthogonal frequency division multiplexing (OFDM) is an effective modulation technique for high-speed transmission over frequency selective fading and multipath channels. However, OFDM systems can be extremely sensitive to synchronization errors. Minor carrier frequency offset and symbol time offset can cause intersymbol and intercarrier interference and degrade system performance very seriously.

In this thesis, the synchronization issue includes preamble detection, frequency offset estimation and frame synchronization is investigated. Mathematics derivation of synchronization approach is introduced and the system performance is simulated by computer. Finally, the system performance is verified by computer simulation results.