降低 CDMA-OFDM 無線系統峰對均值功率比之研究

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摘 要

本論文針對CDMA-OFDM訊號高峰對均值功率比(Peak-to-Average Power Ratio, PAPR)的問題，探討以壓伸(Companding)技術降低其峰對均值功率比，並以模擬方式評估其效能，其中評估標準採用互補累積分佈函數(CCDF)為10-3。壓伸技術是由在發射端使用壓縮器(Compressor)以壓縮訊號振幅動態範圍，達到降低峰對均值功率比目的，而在接收端則使用伸展器(Expander)重建訊號振幅範圍所組成。本文考慮 μ -law、線性對數(Linear Log)、片段線性(Piecewise Linear)及錯誤函數(Error function)等四種壓縮轉換函數，評估其降低CDMA-OFDM系統峰對均值功率比的效能。 根據系統模擬，我們發現當系統展頻因素為8、子載波數為128時，所考慮的四種壓縮轉換函數至少可降低峰對均值比3dB。當系統展頻因素為16、子載波數為256時，所考慮的四種壓縮轉換函數至少可降低峰對均值比2.5dB。以位元錯誤率為10-3為標準時，這四種壓縮轉換函數對能量效益造成的損失在1.2dB到2.2dB之間。相權峰對均值的降低與能量效益損失，在這四種壓縮法當中以片段線性及錯誤函數兩法的整體效能較佳。

關鍵詞 : 峰對均值功率比、壓伸技術、互補累積分佈函數、壓縮器、伸展器

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