非同調多重調變係數cpfsk之最大相似區塊檢測

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摘 要

在本論文中，我們利用最大可能性區塊檢測 (MLBD) 來解調非同調多重調變指數連續相位頻率位移鍵 (Multi-h CPFSK)，同時考慮白色高斯雜訊與平坦拉瑞 (Rayleigh) 衰減通道。在正文中首先介紹最大可能性的機制，並推導出在白色高斯雜訊下，此檢測器的位元錯誤率。此非同調檢測器是由一排匹配濾波器所組成的，且這些匹配濾波器後面分別接著序列估測器。在白色高斯雜訊下，我們驗證了電腦模擬與理論值有相當接近的結果，並比較了四個訊符 (symbols) 觀察的最大可能性區塊檢測，最大可能性序列檢測 (MLSD) 以及一個位元的差分檢測 (one-bit differential detection)。最大可能性區塊檢測比一個位元的差分檢測有大約3 dB 改善，且只有比最大可能性序列檢測有3-4 dB損失。我們也以電腦模擬了最大可能性區塊檢測經由平坦拉瑞衰減通道的情形。在慢速衰減通道下，最大可能性區塊檢測以三個訊符觀察的性能比兩個訊符觀察有1 dB的改善。當衰減變快時，兩個訊符觀察和三個訊符觀察皆會形成錯誤層(error floor)，而在高的訊噪比時，三個訊符觀察的性能會比兩個訊符觀察差。在平坦拉瑞衰減通道下，如果要讓位元錯誤率等於 0.001，則訊噪比約需要30 dB。所以,我們可以推斷最大可能性區塊檢測器在衰減通道下,多重調變指數信號是實際可行的。

關鍵詞 : 最大相似區塊檢測 ; 多重調變係數CPFSK ; 誤碼率 ; 平坦拉瑞衰減通道

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