非歸零預先時瞬時頻率調變脈衝光通信系統之研究

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摘 要

在光通信系統中，將瞬時頻率調變加在非歸零的光信號脈衝上，使得信號頻譜增寬以及在傳輸過程中信 號脈衝寬度極劇加寬。由於這些作用可以降低光纖非線性效應的影響，在信號接收端，經過後置色散補 償還原後可得到較佳的信號品質。這是所謂的非歸零信號瞬時頻率調變脈衝。本論文以數值模擬研究非 歸零信號瞬時頻率調變脈衝在波長多工光通信系統的應用。我們利用非歸零信號格式和餘弦相位調變， 所採用的相位調變頻率考慮和信號率相同頻率以及信號率一半頻率兩種。結果顯示使用相位調變頻率和 信號率相同的系統品質稍佳。不過更重要的是，這種系統雖然信號原為非歸零信號，但在信號接收端經 適當的後置色散元件調整波形後可成為歸零信號。而使用相位調變頻率為信號率一半的系統則無此性質 。使用非歸零信號格式需要做傳輸線編碼，以在信號接收端能順利還原信號時脈。傳輸線編碼的壞處是 會犧牲實質信號率。可轉換成歸零信號的現象表示不再需要使用傳輸線編碼，可充分利用到信號率。因 此在設計上應選擇使用相位調變頻率和信號率相同的系統。

關鍵詞 : 瞬時頻率調變加在非歸零的光信號脈衝

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