多重路徑對波前之影響分析

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摘 要

當電磁波照射金屬物體時，會於物體表面引起電流；接著，電流又再引起電磁輻射，在高頻近似法中，此即為反射(Reflection)或繞射(Diffraction)之現象。在波傳遞過程中，原有的直射波、反射波與繞射波因行經路徑不同，在合成時，會造成相位與振幅的變化，使測試靜區(Quiet zone)波前產生相位、振幅之漣波(Ripple)現象，此即多重路徑(Multi-path)效應。這效應又與電磁波頻率、極化情形、反射體位置及物體形狀等有關，需要探討與分析。 本論文將以中山科學研究院龍園營區之室外遠場為實例，進行分析。這一遠場為量測天線特性與雷達截面積（RCS）之測試場，由於台電公司在附近架設一金屬高壓電塔後，可能產生多重路徑效應，影響此測試場之特性，本文逕以高頻近似法中之幾何光學法（Geometrical Optics）及幾何繞射法（Geometrical Theory of Edge Diffraction）分析直射波與鐵塔繞射波合成後在測試靜區造成之影響。在工作上，先以程式模擬，進行特性分析，然後於本校新完成之微波暗室建立模型，加以實際量測；同時將量測值與模擬值加以比較，以瞭解高壓電塔對龍園天線測試場之影響情形。 在分析過程中，並在天線測試靜區加入不同次方cosine函數權重方式，以增加對反射場及繞射場方向之偵測與判斷，經量測驗證後，確實能準確預測與判斷反射場與繞射場之位置與方向。

關鍵詞 : 幾何光學法 ; 幾何繞射法 ; 物理光學法 ; 多重路徑 ; 測試靜區 ; 權重

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