脉冲波在随机雨介质中的传输特性

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摘要　　在用随机系统法得到随机雨介质中电磁波传输函数的基础上，导出了雨介质中的脉冲波的双频相关函数和强度解析表达式．研究了脉冲波的起伏特性．分析了脉冲波展宽效应机理，得到脉冲波群速度与电波频率、降雨率的函数关系．在毫米波段仿真计算了频率与带宽对脉冲波展宽速率的影响．通过计算得出了以下结果：水平极化脉冲波的展宽速率大于垂直极化的脉冲波；脉冲波展宽速率随带宽和降雨率增加而增加.

关键词　　雨介质　脉冲波　双频相关函数　展宽
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Characteristics of pulse wave propagation in the random rain medium

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Abstract

Based on the transmission function of an electromagnetic wave in the random rain medium by the random system method, the expressions for the double-frequency correlation function and the intensity of a pulse wave are derived. The pulse fluctuation characteristic and the pulse broadening effect are investigated. The function relation of pulse group velocity with frequency and rain rate is obtained. The effects induced by the EM wave frequency and bandwidth on the pulse broadening velocity is studied and the simulated results are given in the mm band. The results show, based on the calculation in this paper, that the pulse broadening velocity of horizontal polarization wave is greater than that of the vertical polarization wave and that the pulse broadening velocity increases with an increase in bandwidth and rain rate.

Key words　rain medium　pulse wave　double-frequency correlation function　broadening

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