

论文

## 地下三维目标电磁散射的矩量法计算

于继军<sup>①②</sup>, 盛新庆<sup>①③</sup>

<sup>①</sup>中国科学院电子学研究所微波成像技术国家重点实验室 北京 100080; <sup>②</sup>中国科学院研究生院 北京 100039; <sup>③</sup>北京理工大学电子工程系 北京 100081

收稿日期 2005-1-26 修回日期 2005-10-18 网络版发布日期 2007-12-3 接受日期

摘要

该文给出了一种用层状介质中的混合势积分方程(MPIE)和基于RWG基函数的矩量法计算地下三维目标电磁散射的精确快速实施方法。对MPIE的RWG矩量法的开发、计算性能做了研究,尤其是对其中的多个不同形式的Sommerfeld积分的快速全波数值离散复镜像计算方法做了仔细研究。该文的实施方法退化到自由空间后的计算结果与解析解Mie Series吻合的很好,而且地下平板的计算结果也与以往公布结果吻合得很好,证实了该文实施方法的可行、高效、精确。除此以外,该文还计算了其它形状目标在不同大小、不同埋藏深度、以及不同地层媒质下的电磁散射特征。

关键词 [地下目标](#) [电磁散射](#) [矩量法](#) [全波数值离散复镜像](#) [Sommerfeld积分](#)

分类号 [O441](#)

## Scattering from 3-D Targets in the Subsurface Using MOM

Yu Ji-jun<sup>①②</sup>, Sheng Xin-qing<sup>①③</sup>

<sup>①</sup>National Key Laboratory of Microwave Imaging Technology, Institute of Electronics, Chinese Academy of Sciences, Beijing 100080, China; <sup>②</sup>Graduate School of the Chinese Academy of Sciences, Beijing 100039, China; <sup>③</sup>Dept. of Electronic Engineering, Beijing Institute of Technology, Beijing, 100081, China

Abstract

In this paper, an accurate and efficient implementation approach of the Method of Moments (MOM) is developed to compute scattering from 3-D targets in the subsurface, which is based on the Mixed Potential Integral Equation (MPIE) in layered media and the RWG basis function. The implementation skill and computing performance of the proposed approach are studied in detail. In particular, how to efficiently calculate various different Sommerfeld integrals (SIs) is numerically investigated with the discrete complex images technique. The computed results of the targets in free space are in agreement with Mie Series results and the computed results of subsurface flat are also in agreement with the published data, which shows the reliability, efficiency and accuracy of the developed approach. Furthermore, the EM scattering of other shaped targets is computed at different size, buried depth, and subsurface medium.

Key words [Subsurface targets](#) [EM scattering](#) [MOM](#) [Full wave numerical discrete complex images](#) [Sommerfeld integrals](#)

DOI:

通讯作者

作者个人主页 于继军<sup>①②</sup>; 盛新庆<sup>①③</sup>

### 扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF \(285KB\)](#)
- ▶ [\[HTML全文\]\(OKB\)](#)
- ▶ [参考文献\[PDF\]](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“地下目标”的 相关文章](#)
- ▶ 本文作者相关文章

- [于继军](#)
- [盛新庆](#)