[打印本页] [关闭]

防御电子技术

# 基于渐近波形估计与混合粒子群算法的目标外形反演

黄国荣，钟卫军，张吉广

（空军工程大学工程学院， 陕西 西安 710038）

摘要：

提出了一种能同时重构多个导体目标外形的新方法——混合粒子群算法。利用矩量法和渐近波形估计技术求解电磁散射问题，以测量的散射场和计算散射场偏差作为目标函数，将待优化变量设置为目标的截面轮廓近似表达的三角级数形式的系数，通过混合粒子群算法对待优化变量进行优化，使目标函数达到最小值来对自由空间中的散射体进行电磁成像。仿真结果表明，混合粒子群算法比伪群交叉算法具有更好的收敛性能和成像精度，具有较强的抗随机噪声干扰能力。

关键词： 电磁逆散射 伪群交叉算法 混合粒子群算法 收敛 渐近波形估计

# Targets shape reconstruction based on asymptotic waveform evaluation and hybrid particle swarm optimization

HUANG Guo-rong, ZHONG Wei-jun, ZHANG Ji-guang

(Engineering Coll., Air Force Engineering Univ., Xi'an 710038, China)

Abstract:

A novel approach to the microwave imaging of the perfectly conducting objects in free space using hybrid particle swarm optimization (HPSO) is put forward. A scattering model based on the momentum method and the asymptotic waveform evaluation (AWE) is used to solve the scattering problem. The error between measured scattering data and computed scattering data is considered as the object function. The shape function of the conductor is approximated by a triangular series. The inverse scattering problem is transferred into an optimization problem by minimizing the object function with triangular series parameters being optimization parameters which are solved by hybrid particle swarm optimization. A comparisons between the pseudo swarm crossover (PSC) and hybrid particle swarm optimization is carried out. The results show that the hybrid particle swarm optimization algorithm has a better convergence and imaging precision, especially more robust antijamming than the PSC one.

Keywords: electromagnetic inverse scattering pseudo swarm crossover (PSC) hybrid particle swarm optimization (HPSO) convergence asymptotic waveform evaluation (AWE)

通讯作者：

作者简介：

作者Email：

参考文献：

## 本刊中的类似文章

1．张昌芳,杨宏文,胡卫东,郁文贤.基于改进冲突度量的证据组合新规则[J]. 系统工程与电子技术, 2009,31(11): 2637-2640

2．徐湘元.反推技术及其在不确定系统中的应用[J]. 系统工程与电子技术, 2009,31(11): 2703-2709

3．樊仲光1,3，梁家荣2，肖剑1.不确定奇异系统的Terminal滑模控制[J]. 系统工程与电子技术, 2010,32(1): 158-161