

工程与应用

利用免疫克隆粒子群混合算法实现自适应PMD补偿

朱奇光

燕山大学 信息科学与工程学院,河北 秦皇岛 066004

收稿日期 修回日期 网络版发布日期 2007-8-29 接受日期

摘要 提出了一种免疫克隆算法与粒子群优化 (PSO) 算法相结合的混和算法来进行函数优化,克服了PSO算法容易陷入局部极值的不足,通过免疫克隆算法的应用,提高了种群的多样性,增强了算法全局搜索的能力,提高了收敛速度和精度。仿真结果表明,该算法在搜索多维函数最优解中具有优良的性能。将该混和算法应用到光纤偏振模色散 (PMD) 补偿系统中,补偿后,眼图恢复效果很好,补偿系统的搜索时间最短可达71 ms,响应恢复小于20 ms,实现了对光纤通信系统的实时自适应PMD补偿。

关键词 [自适应补偿](#) [粒子群优化 \(PSO\) 算法](#) [免疫克隆 \(IC\) 算法](#) [偏振模色散 \(PMD\)](#) [偏振度 \(DOP\)](#)

分类号

Realization of adaptive PMD compensation using hybrid IC-PSO algorithm

ZHU Qi-guang

Institute of Information and Science Engineering, Yanshan University, Qinhuangdao, Hebei 066004, China

Abstract

A hybrid algorithm combining Immunity Clone (IC) algorithm with Particle Swarm Optimization (PSO) algorithm is proposed and applied to optimize functions, which overcomes the shortcoming of converging to local optimum for PSO algorithm. By introducing the IC algorithm, the diversity of particle swarms and the converging rate and accuracy is increased, and the capability of global searching is enhanced. From the simulation results, it is shown that the hybrid algorithm has perfect property in multi-dimension function searching. The algorithm can be adopted in adaptive polarization mode dispersion compensation system, and after compensation, the recoverage effect of eye diagram is obviously good. The searching time of the compensation system can be attained to 71 ms and the response time is less than 20 ms, which can achieve the real time adaptive PMD compensation.

Key words [adaptive compensation](#) [Particle Swarm Optimization \(PSO\)](#) [Immune Clone \(IC\) algorithm](#) [Polarization Mode Dispersion \(PMD\)](#) [Degree Of Polarization \(DOP\)](#)

DOI:

通讯作者 朱奇光 [E-mail: zhu7880@ysu.edu.cn](mailto:zhu7880@ysu.edu.cn)

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(1532KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [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“自适应补偿” 的相关文章](#)
- ▶ [本文作者相关文章](#)
- [朱奇光](#)