

# 一种改进的自适应步长的萤火虫算法

李顺<sup>1,2</sup>, 郭星<sup>1,2</sup>

(1 安徽大学 智能嵌入式技术研究中心, 安徽 合肥 230601; 2 安徽大学 计算机科学与技术学院, 安徽 合肥 230601)

**摘要:** 提出一种预防萤火虫失活的自适应步长的萤火虫算法(PA-GSO).第一, 步长采用非线性递减方式, 初期步长较大移动速度快, 后期步长逐渐减少至固定的较小值, 实现了算法精度和速度的平衡.第二, 为了应对萤火虫的邻居集合为空集时可能丧失移动能力的现象, 采用了预防萤火虫失活机制优化萤火虫运动.通过实验对比 GSO, A-GSO 和 CSGSO 算法, 各方面指标验证了 PA-GSO 算法在寻优精度、收敛速度和稳定性等方面的提升.

**关键词:** 萤火虫算法; 自适应步长; 预防失活

中图分类号: TP391.9

文献标识码: A

文章编号: 1000-7180(2018)08-0093-04

## **An Improved Glowworm Swarm Optimization Algorithm with Adaptive Step**

LI Shun<sup>1,2</sup>, GUO Xing<sup>1,2</sup>

(1 Intelligent Embedded Technology Research Center, Anhui University, Hefei 230601, China; 2 School of Computer Science and Technology, Anhui University, Hefei 230601, China)

**Abstract:** An Preventing-inactivation adaptive-step GSO (PA-GSO) is proposed to prevent firefly inactivation. The first step is non-linear decreasing method. The initial step is larger and the moving speed is faster, and the later step is gradually reduced to a fixed smaller value, which realizes the balance of precision and speed in algorithm. And then in order to cope with the firefly's neighbor with the empty set may lose the mobility, using the prevention of firefly inactivation mechanism to optimize the firefly movement. By comparing the GSO, A-GSO and CSGSO algorithms, the PA-GSO algorithm is further improved in optimization accuracy, convergence speed and stability.

**Key words:** GSO; adaptive step; prevent inactivation

**作者简介:**

李顺男 (1993-), 硕士研究生. 研究方向为群智能算法, 智能嵌入式硬件. E-mail: 13955105560@163.com.

郭星男 (1983-), 博士, 讲师. 研究方向智能数据处理, 模式识别与信号处理.