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基于自由搜索算法的灌渠配水优化模型

Optimization model for discharge distribution of irrigation channels based on free search algorithm

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中文摘要:

国内外现有的渠道配水模型是建立在下级渠道流量相等、上级渠道断面均匀水力参数相同的基础上,无疑限制了模型的应用范围。针对该种不足,该文建立了考虑下级渠道流量不等和上级渠道断面变化的精细化配水模型。在模型求解方面,通过构建合理的适应度函数和对约束条件的高效处理,应用自由搜索算法对模型进行了求解。应用结果表明,采用本模型和算法得到的配水方案与原配水方案相比,输水渗漏损失减少了8.26%;配水过程也更加均匀,有效减少了闸门调节次数。

英文摘要:

The existing water-distribution models in irrigation canal system are established on the basis that the water discharge of the lower-level canals are equal and the cross sections of upper-level canals are unchanging with equal hydraulic power parameters, which limited the application of models. A new-type refined water-distribution model was developed, which took into account such factors as variations of water discharge of the lower canals and the conditions of section changes of the upper canals. By means of constructing reasonable fitness functions and through high-efficiency processing with the limited conditions, the model was solved based on free search algorithm. The application result showed that compared with the original way of water-distribution, water loss by this model reduced by 8.26%. As a result, the course of water-distribution was more regular and the regulating frequency of sluice gates was effectively reduced.

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