15th International Conference on Innovative Computing, Information and Control (ICICIC2021)
Online, September 15–16, 2021

Paper ID: ICICIC2021-301

Two Integral-Based Methods for Evaluating Intelligent Agricultural Greenhouses with Fuzzy Information

Junhu Ruan[1,*], Yanbing Yang[2], Xuping Wang[3], Baofeng Shi[1] and Yan Shi[4]

[1]College of Economics and Management
Northwest A&F University
Yangling 712100, P. R. China
*Corresponding author: ruanjunhu@mail.dlut.edu.cn

[2]Department of Mathematics
Dalian Maritime University
Dalian 116024, P. R. China

[3]Institute of System Engineering
Dalian University of Technology
Dalian 116023, P. R. China

[4]General Education Center
Tokai University
9-1-1 Toroku, Kumamoto 862-8652, Japan

Abstract. This work presents two integral-based methods for evaluating intelligent agricultural greenhouses when the evaluation index data are fuzzy values. From the view of the whole monitoring system of intelligent agricultural greenhouses, an evaluation index system which fully reflects the performance of five related subsystems is identified. We combine Liou and Wang's integral-based method respectively with classic weighting method and TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) to formulate two integral-based evaluation methods of intelligent agricultural greenhouses with fuzzy information, that is, integral-based weighting method and integral-based TOPSIS method. Numerical results show the effectiveness and advantage of the proposed methods.
Keywords: Intelligent agricultural greenhouses, Fuzzy evaluation, Integral-based methods, TOPSIS