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An improved flower pollination algorithm for optimization of intelligent logistics distribution center

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ABSTRACT

It is easy to fall into local optimal solution in solving the optimal location of intelligent logistics distribution center by traditional method and the result of optimization is not ideal. For this, the study puts forward an optimization method of intelligent logistics distribution center based on improved flower pollination algorithm. This method uses the logic self-mapping function to carry out chaotic disturbance to the pollen grains, so that the pollen grain set lacking the mutation mechanism has strong self-adaptability, and the convergence of the optimal solution in the later stage of the algorithm is effectively prevented. The boundary buffer factor is used to buffer the cross-boundary pollen grains adaptively so as to prevent the algorithm from the local optimization, and the convergence speed and the optimization accuracy of the algorithm can be improved obviously in processing the optimal location of intelligent logistics distribution center. The convergence of the algorithm is analyzed theoretically by using the real number coding method, and the biological model and theoretical basis of the algorithm are given. The experimental results show that the proposed method has better performance than the traditional one, and the algorithm outperforms a genetic algorithm and particle swarm algorithm. It provides a feasible solution for the intelligent logistics distribution center location strategy. It affords a good reference for improving and optimizing the internal logistics of the manufacturing system and the operational efficiency of the entire intelligent logistics system.

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Izvirni znanstveni članek

Izboljšan algoritem cvetnega opraševanja za optimizacijo inteligentnega logističnega distribucijskega centra

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POVZETEK

Pri določanju optimalne lokacije inteligentnega logističnega distribucijskega centra po tradicionalni metodi je enostavno priti do lokalne optimalne rešitve, vendar tak rezultat optimizacije ni idealen. V ta namen je v študiji predstavljena metoda optimizacije inteligentnega logističnega distribucijskega centra, ki temelji na izboljšanem algoritmu cvetnega opraševanja. Ta metoda uporablja logično funkcijo samopreslikave za vnašanje kaotičnih motenj na zrna cvetnega prahu, tako da ima garnitura zrn brez mehanizma mutacije močno samoprilagodljivost in učinkovito preprečuje konvergenco optimalne rešitve v kasnejši fazi algoritma. Mejni zaščitni faktor se uporablja za adaptivno prilagajanje čezmejnih zrn, da se algoritmu prepreči lokalna optimizacija, hitrost konvergence in natančnost optimizacije algoritma pa se pri iskanju optimalne lokacije inteligentnega distribucijskega logističnega centra izboljšata. Konvergenca algoritma se teoretično analizira z uporabo metode kodiranja v realna števila, podani so biološki model in teoretična osnova algoritma. Eksperimentalni rezultati kažejo, da predlagana metoda doseže boljše rezultate od tradicionalne in da algoritem prekaša genetski algoritem in algoritem roja delcev. Metoda ponuja izvedljivo rešitev za strategijo lociranja inteligentnega distribucijskega centra in podaja dobro referenco za izboljšanje in optimizacijo notranje logistike proizvodnega sistema in operativne učinkovitosti celotnega inteligentnega logističnega sistema.

PODATKI O ČLANKU

Ključne besede:
Inteligentna logistika;
Distribucijski center;
Optimizacija;
Inteligenten optimizacijski algoritem;
Algoritem cvetnega opraševanja;
Inteligentna lokacija

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