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# Research on recovery strategies of supply chain network under disruption propagation using memetic algorithm

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**A B S T R A C T**

In the context of the economic globalization, there is an increased disruption risk in the supply chain network due to the outsourcing, complexity and uncertainty. At the same time, the disruption may propagate across the entire supply chain network because of the interdependence. With the resource constraints, appropriate recovery strategies which can minimize the impact of disruption propagation and effectively improve the supply chain network resilience have attracted a great deal of attention. In this paper, we first construct the disruption propagation model considering the recovery strategy based on the characteristics of the competitiveness, time delay and underload cascading failure in the supply chain network. This model uses the memetic algorithm to determine the set of recovery nodes among all disruption nodes, which can minimize the impact of disruption propagation. And then, the simulation analysis is conducted on the synthetic network and the real-world supply chain network. We compare the proposed recovery strategy with other strategies (according to the genetic algorithm, according to the descending order of the load of failure node, according to the ascending order of the load of failure node, according to the descending order of the node degree, according to the ascending order of the node degree) and provide decision-making reference against supply chain disruptions.

**A R T I C L E I N F O**

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Supply chain network;
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# Raziskava o strategijah obnove dobavne verige ob širjenju motenj z uporabo memetičnega algoritma

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**POVZETEK**

V okviru gospodarske globalizacije se zaradi zunanjega izvajanja dejavnosti, kompleksnosti in negotovosti povečuje tveganje motenj v omrežju dobavne verige. Hkrati se lahko motnja zaradi soodvisnosti razširi po celotnem omrežju dobavne verige. Zaradi omejenih virov so ustrezne strategije obnove, ki lahko zmanjšajo vpliv širjenja motenj in učinkovito izboljšajo odpornost omrežja dobavne verige, pritegnile veliko pozornosti. V tem članku najprej oblikujemo model širjenja motenj ob upoštevanju strategije obnove na podlagi značilnosti konkurenčnosti, časovnega zamika in kaskadne odpovedi zaradi premajhne obremenitve v omrežju dobavne verige. Ta model uporablja memetični algoritem za določitev nabora vozlišč za obnovo med vsemi vozlišči motenj, ki lahko zmanjšajo vpliv širjenja motenj. Nato je izvedena simulacijska analiza na sintetičnem omrežju in realnem omrežju dobavne verige. Predlagano strategijo obnovitve primerjamo z drugimi strategijami (genetskim algoritmom, padajočim vrstnem redom obremenitve vozlišča okvare, naraščajočim vrstnim redom obremenitve vozlišča okvare, padajočim vrstnim redom stopnje vozlišča, naraščajočim vrstnim redom stopnje vozlišča) in zagotovimo izhodišče za odločanje v primeru motenj v dobavni verigi.

**PODATKI O ČLANKU**

*Ključne besede:*
Omrežje dobavne verige;
Širjenje motenj;
Strategija obnove;
Memetični algoritem

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