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Change impact analysis of complex product using an improved three-parameter interval grey relation model

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ABSTRACT

Change impact evaluation of complex product plays an important role in controlling change cost and improving change efficiency of engineering change enterprises. In order to improve the accuracy of engineering change impact evaluation, this paper introduces three-parameter interval grey number to evaluate complex products according to the data characteristics. The linear combination of BWM and Gini coefficient method is used to improve the three-parameter interval grey number correlation model. It is applied to the impact evaluation of complex product engineering change. This paper firstly constructs a multi-stage complex network for complex product engineering change. Then the engineering change impact evaluation index system is determined. Finally, a case analysis was carried out with the permanent magnet synchronous centrifugal compressor in a large permanent magnet synchronous centrifugal unit to verify the effectiveness of the proposed method.

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Keywords:
Manufacturing;
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Three-parameter interval grey number;
Grey relational model;
BWM method (best-worst model);
Gini weighting method

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Izvirni znanstveni članek

Analiza vpliva sprememb kompleksnega izdelka z uporabo izboljšanega sivega relacijskega modela z intervalom treh parametrov

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POVZETEK

Za podjetja, ki vpeljujejo inženirske spremembe ima vrednotenje vpliva sprememb pri kompleksnih izdelkih pomembno vlogo pri nadzoru stroškov sprememb in izboljšanju učinkovitosti sprememb. Da bi izboljšali natančnost ocene vpliva inženirskih sprememb, je uveden sivi relacijski model z intervalom treh parametrov za oceno kompleksnih izdelkov glede na značilnosti podatkov. Linearna kombinacija metod BWM in Ginijevega koeficienta se uporablja za izboljšanje sivega relacijskega modela z intervalom treh parametrov. Uporablja se za vrednotenje vpliva kompleksnih inženirskih sprememb izdelka. Ta članek najprej vzpostavi večstopenjsko kompleksno omrežje za kompleksno inženirsko spremembo izdelka. Nato se ovrednoti sistem kazalnikov s katerimi se oceni vpliv inženirskih sprememb. Da bi preverili učinkovitost predlagane metode je bila na koncu izvedena študija primera s sinhronim centrifugalnim kompresorjem s trajnimi magneti v veliki sinhroni centrifugalni enoti s trajnimi magneti.

PODATKI O ČLANKU

Ključne besede:
Izdelava;
Inženiring;
Kompleksni izdelek;
Analiza vpliva sprememb;
Sivo število z intervalom treh parametrov;
Sivi relacijski model;
Metoda BWM (najboljši-najslabši model);
Ginijeva metoda uteževanja

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