

# 智慧型組裝順序規劃KBE系統

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## 摘要

The purposed research is to build an intelligent KBE system for assembly sequence planning (ASP). The knowledge-driven concept of product design is a novel trend of current computer aided design (CAD) system, knowledge-based engineering (KBE) can be an integrated processing technology, which merges the original engineering design experiences, design achievements and domain know-how, fulfills the connections with CAX (CAD/CAM/CAE/CAPP/CAI) system via the knowledge reuse, and further reduces the workloads of product development and promptly boosts the design efficiencies.

Therefore, the purposed research joins back-propagation neural network (BPNN) algorithm and UG NX/KF second development module to create feasible assembly sequences. System user can easily access the volume, weight and feature number through NX system, and input the related parameters such as contact relationship number and total penalty value, and predict the feasible assembly sequence via a robust BPNN engine. In addition, the existing system can demonstrate the explosion views and vivid assembly simulations, save the entire assembly information, and setup a splendid knowledge base.

Finally, the study apply the toy car model as a learning BPNN engines, facilitate assembly sequence optimization a (training) sample and toy motorbike model, real-world brushless DC fan as testing and verified samples. The results show that the proposed model can efficiently generate and allow the designers to recognize the contact relationships, assembly difficulties and assembly constraints of three-dimensional (3D) components in a virtual environment type.

**關鍵字：**KBE system, back-propagation neural network, knowledge-based engineering, assembly sequence planning