Tolerance Analysis in Flexible Assembly Systems

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ABSTRACT

Assembly process is a sequence operation of combining part into semi-products and final product. Tolerance analysis tries to predict assembly tolerance for final product, it must avoid by individual tolerance accumulation result in unexpected assembly rejection. Under flexible assembly systems environment, production characteristic trend to large varieties and small volume, traditional tolerance analysis models in statistical assumption is not appropriate for this case. The idea of this research is to establish the tolerance analysis procedure for modular flexible assembly systems and concern product''''s small batch production, and the requirements of common parts or exchangeable components. This research will apply the concept of artificial neural network to develop tolerance analysis model, it can replication total dimension variation and accurately predict a tight assembly tolerance. This research reveals when tolerance distribution of part is mixed, using artificial neural network is better then traditional models in assembly tolerance. For different statistical distribution, applying artificial neural network to determine whether assembly tolerance meats the specification or not, it can obtain 87% total positive ratio.

Keywords : Tolerance Analysis ; Flexible Assembly Systems ; Artificial Neural Network

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