

AUTOMATIC FEATURE RECOGNITION FOR ROTATIONAL PARTS

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Key Words: CAPP; CAD/CAM, Turning Process, Manufacturing Features Recognition, STEP Format.

The main goal of any manufacturing organization is to produce high quality products at a competitive price. At the same time, the continuous changes in customer needs are to be satisfied. To suit these requirements, several software spanning various disciplines have been designed to automate every step involved in the life cycle of a product, ensuring an easier, a faster and a flexible workflow [1]. In spite of using advanced automation technology, the link between CAD and CAPP systems is still not integrated as desired [2]. This paper presents a new methodology of recognizing turning features taking STEP AP203 E2 file as an input to the system. The methodology works in three main modules namely Geometric and Topological Data Extraction module, Features Recognition module and Feature Generator module. In the first module, geometric and topological data are recognized and extracted from STEP file using C++ programming. These data are reordered coherently and stored in a database according to the hierarchical structure of STEP file [3]. The second module consists of analysing the extracted geometric and topological data such as circle centers coordinates, edges, loops, type of surfaces, and so on. The rule-based approach is used to identify a feature according on certain prespecified rules that are characteristic to the feature. A library which consists of turning-pre-defined manufacturing features is elaborated to enable the automatic recognition at a first stage. The last module addresses evaluation of frontier surfaces of each manufacturing feature (MF) obtained by upstream module in order to distinguish between perfect manufacturing feature (PMF) and imperfect manufacturing feature (IMF). Material surfaces of IMF are used to be extended so as to generate new MFs with multiple interpretations resulting by features interactions [4, 5]. At a second stage, the features recognition module is applied to confirm the type of the extended features and to extract their new dimensional parameters. An illustrative example is presented to test and validate the method.

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