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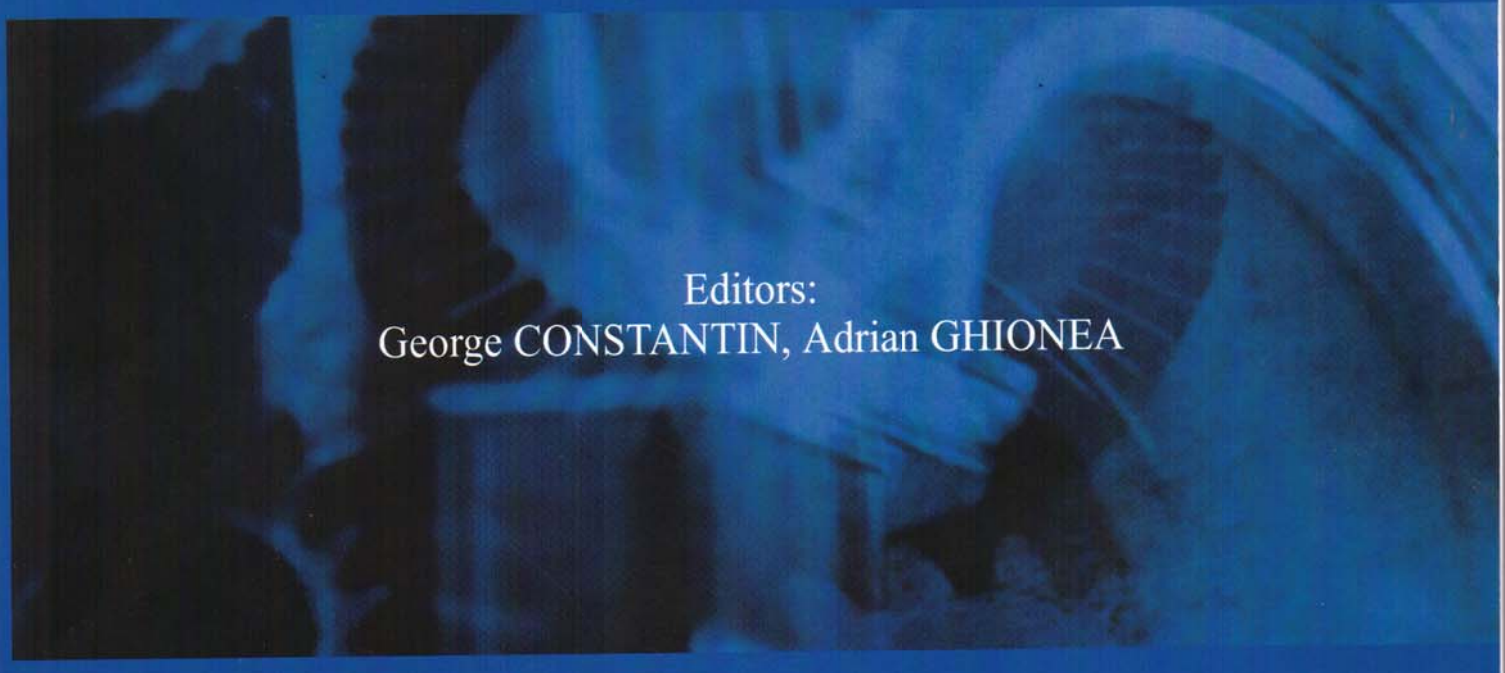

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ADVANCED PARAMETERIZATION OF CAD-CAM PROCESS FOR MACHINING RAIL WHEELS ON A LATHES

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Abstract: *In this paper some aspects regarding advanced parameterization of a lathe cutting process for a specialized field – rail wheel machining are presented. A method was developed for obtaining an optimum NC file by taking into account: design, machining technology aspects and machine dynamic behavior in cutting process. Some correction coefficient and parameters for CAD, CAM and postprocessors are defined based on the rail wheel dimension and machine displacement. The next step consists of implementation of this method in machining process for smart cutting.*

Key words: *CAD, CAM, dynamic behavior, machining, rail wheel.*

1. INTRODUCTION

Today the industrial demands are more and more high. In order to be more competitive on the market the requests of factories are for high quality of the products, short execution time togetehr with lower price [1].

Inside of the production system for achieving these goals, the engineers use high quality machines and specialized software.

Among the priorities of manufacturers, in their attempt to be more competitive and better serve their customers, it is necessary to shorten delivery times. Manufacturers strive to do things faster at every stage of the process, attempting to reduce time for design, programming, machining, and inspection. Two machining methods, High Speed Milling (HSM) and High Performance Machining (HPM), have become increasingly popular because of their ability to drastically speed up machining, while achieving better results [2, 3].

The general flow of a part into a manufacturing process consists in machining, (that involve CAD-CAM-Postprocessing-Cutting process on a machine tool), assembling, inspection, and delivering. In Fig. 1 it is presented the general schema for the flow of a part into industrial process.

Milling is the most common form of machining, a material removal process, which can create a variety of features on a part by cutting away the excess material. The milling process requires a milling machine, workpiece, fixture, and cutter. The workpiece is a piece of pre-shaped material that is secured to the fixture, which itself is attached to a platform inside the milling machine. The cutter is a cutting tool with sharp teeth that is also secured in the milling machine and rotates at high

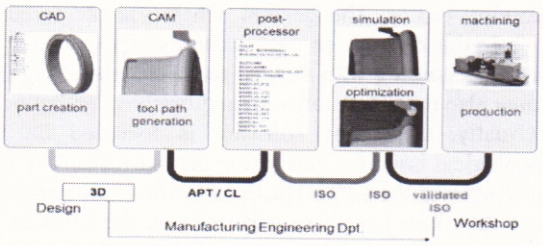

Fig. 1. Part form CAD to machining.

speeds. By feeding the workpiece into the rotating cutter, material is cut away from this workpiece in the form of small chips to create the desired shape.

Turning is typically used to produce parts that are axially symmetric. Parts that are fabricated completely through milling and turning often include components that are used in limited and large quantities (prototypes, such as custom designed fasteners or brackets) [4].

The manufacturing process design is made with specialized software which generates automatically the NC software [5]. The advanced CAM software used 3D models of the pieces to generate complex NC programs for many types of operations: surface milling, turning at high and classical speed on machine tools with up to 5 CN axes.

2. FROM CAM TO NC DATA AND MACHINING

All the information from CAM software must be transferred on a machining center in order to process the part.

This transfer is made by an interface software between the CAM software and Machine called postprocessor.

Normally, for machine and CAM software it must be a postprocessor which is capable to read the information from computer and based on the machine capabilities to

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