

THE BRIEF VIEW ON ARTIFICIAL INTELIGENCE TOOLS AS INSTRUMENT OF EFFECTIVITY IMPROVEMENT OF PROCESS PLANNING IN CHIPLESS TECHNOLOGIES

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Abstract: The paper presents brief view of complex effective of technological product preparation with aspect to non-machining technologies. It is relatively complicated problem close-knit with cost structure in design phase of process and real production phase too. The article describes possibilities of application of particular tools of artificial intelligence in design stage on the ground of forging and casting process specifics.

Key words: technological product preparation, artificial intelligence, expert systems fizzy sets

1. INTRODUCTION

The economic valuation of the engineering works automation is relatively complicated. The effectiveness measure can not be only the computer putting volume and its common using. The key condition in this case is not computer support quantity, but its quality. It is conditional by level of computer using sophistication. The engineering works automation expresses oneself not only in frame of pre-production phase, but in real production process too. And it can be either in positive or sometimes unfortunately in negative tendency. It is implication of availability of chosen automation instruments (CA systems, expert systems, database systems etc.) and level of user knowledge.

2. TOOLS OF THINKING SIMULATION

The fundamental equipment of human thinking simulation, among which belong expert systems, fuzzy sets, neuron nets respectively genetic algorithms, are well known. The question however is their application in the solving of actual practise problems. In mechanical technologies frame with aspect to non-machining technologies (forging or casting e.g.) is probably the simplest using of expert systems. In this case we can apply empty expert systems, which are available in software market (EXSYS Corvid e.g.) too. The priority task is filling these systems by effective sequence of rules created on the ground of obtained knowledge (Fig.1, 2), what is not easy matter.

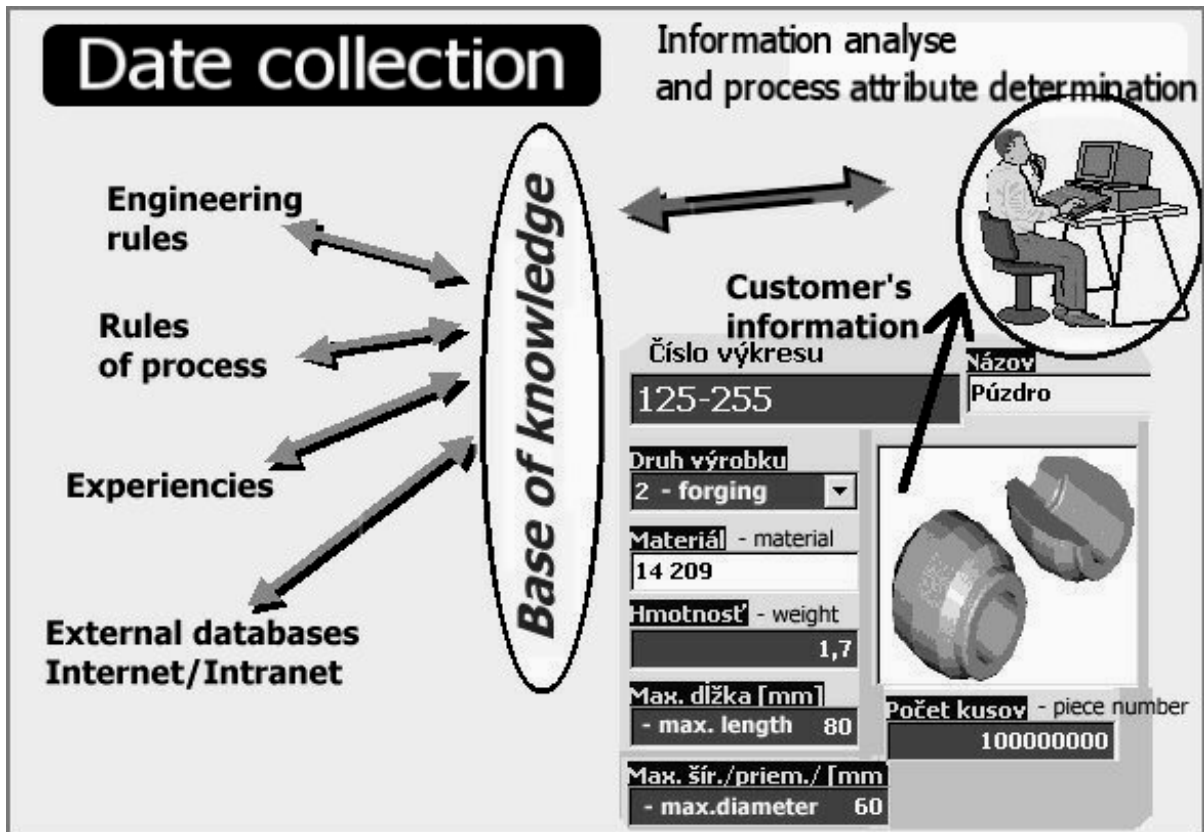


Fig. 1. Dates cumulating

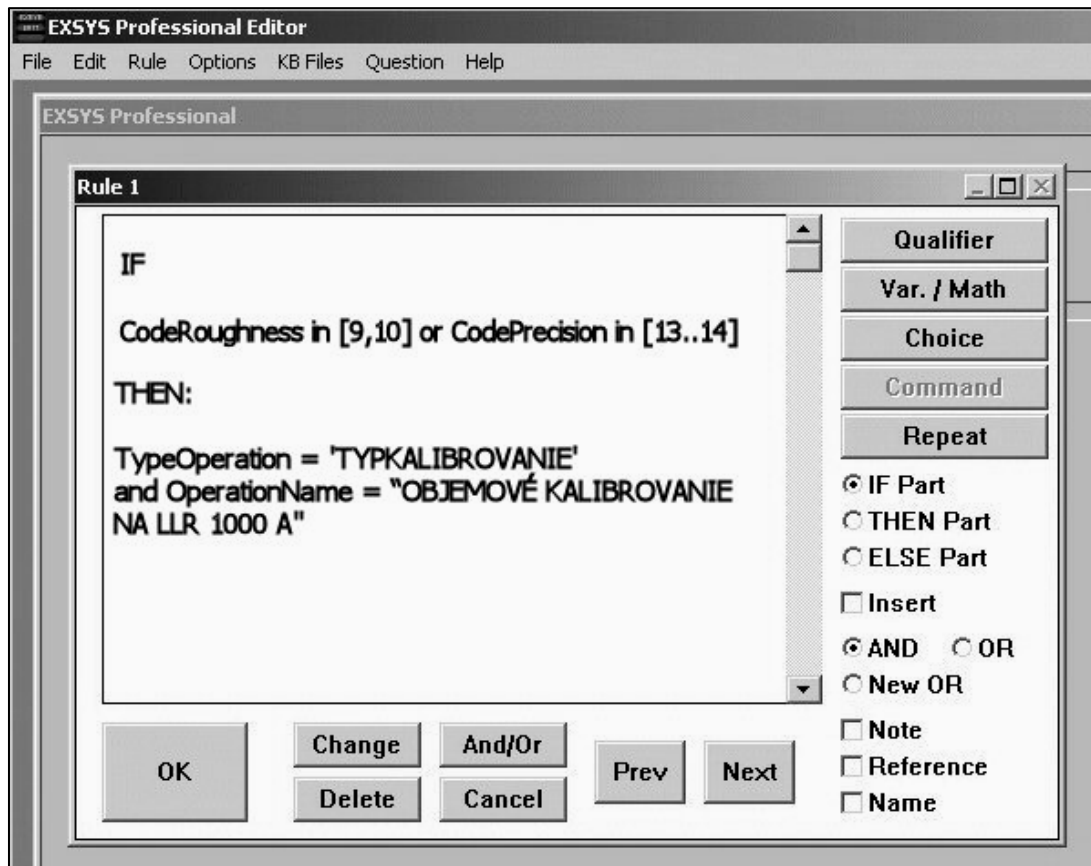


Fig. 2. Empty expert system filling

The computer systems as instruments of product process design in frame of chipless technologies should not solve only exact tasks. This area is in a matter of fact only elimination of routine works in design process. Digitalisation of experience and human thinking is also indubitable fact in product process design. It is conditional by often necessity using of hard determinable process parameters.

The aim of effectiveness improvement of technological production preparation in frame on forging or casting is evolving of methodology for tasks solving, which are hard descriptionable (part complexity, shape segmentation, material flowing, etc.), by means of instruments based on the theory of fuzzy sets. The theory of fuzzy sets is powerful instrument enabling to build special modules of information systems reflective real processes. The necessary condition is analyse of relations between unsharp input dates and output dates, rules systematization advisable for fuzzifying of problem to gain output dates with maximal possible accuracy rate.

The properly designed methodology can be basis for creating of fuzzy modules of information systems for actual process in concrete manufacturing conditions.

For solving of tasks, where is assumption of occurrence more then one local extreme (Fig. 3), is suitable to apply principles based on genetic algorithms.

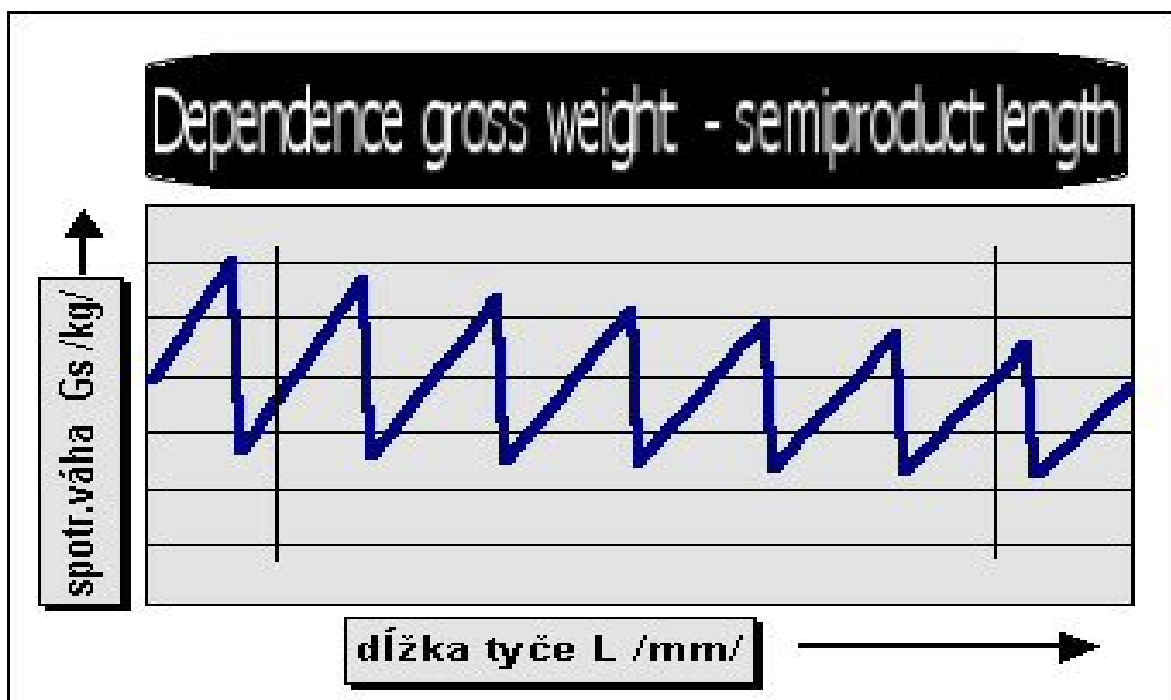


Fig.3. Dependence gross weight on cutting length

3. CONCLUSION

The access to artificial intelligence tools application in production design stage has to be responsible. The analysis of structure solving tasks structure is important according to the choice of useful tool for achievement of optimal results. In some case will be surely sufficient instruments of "conventional mathematics", respectively conventional approaches to problem solving.

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