POSSIBILITY OF UTILIZING OF ADVANCED METHODS IN CAPP

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Abstract: *By development of CAPP systems occur a lot of problems bonded with algorithmization elements from real world to mathematic models. Our article brings list of some course to resolve this problems.*
Key words: *CAPP systems, GA, Fuzzy Logic, Neural networks*

1. INTRODUCTION:

Technical advancement in mechanical engineering has request parallel progress in tools for manufacturing prepare based on CA technologies. Group of CA systems has allowed using of principles of concurrent engineering, modern viewing engines, computing methods, rapid prototyping tools, etc. CA systems penetrated into separately industry branches. It has an output in form of product lifecycle contraction, less ecology devastation, productivity and quality rising.

New technologies using and accumulative requirements on activities realized in prepare phase of time-to-market have enforced to expand possibilities of exists CAPP systems. New methods application has allow real modeling of mechanical processes and objects with tools of object oriented programming, linear computing approaches into parallel rebuilding.

New methods

- Genetic algorithm
- Fuzzy logic
- Neural networks
- Object and relation databases
- Clustering
- Petri's networks
- Abstract dimensions visualization

- Operations in data structures
- Data exchange

Genetic Algorithm

Approach to solutions problems with GA is based on figure from nature. Basic elements are genome, chromosome and population. On this elements are execute basic operations as crossover, mutation. GA is able to escape from global extreme when they resolve solution and to find another local extremes.

During real data processing it is need to code input parameters. Encryption choosing depends on kind of problem decising. Text coding, alpha - numeric and finally binary coding are most used types of algorithms. At the same time after successfully algorithm work finishing it is very important to reverse decode outputs. Genome is main build feature of GA. It's function in GA is identical with function in nature. Chromosomes are crated by joining of genomes. Every chromosome represents concrete value from resolved area. Chromosome group does make a population. Her size is primary defined by type of problem. For successfully complete to setup option of iteration end is needed. GA can be terminated by filling of fitness function condition or by allowed number of populations achieving.

Fitness function is feature, by which we determine applicability of individual chromosomes for solution result.

On the beginning of genetic algorithm result definition area must be determined. First population is initiated by random selection of solid number of chromosomes from status space. Next the chromosomes are exposed to operations of crossover and mutation, which caused new individual nucleation. After this, individuals for next generations are by selection operations selected. Every new individual is classified by fitness function and in cause of solution finding GA is stopped. Operation of crossover is most occurred from previous operations, applied over chromosomes. Probability of mutation depends on chosen selection press. Selection press volition is defined by way of chromosomes selection. Most often we meets with tournament or roulette selection.

Fuzzy logic

Fuzzy logic is a superset of conventional (Boolean) logic that has been extended to handle the concept of partial truth -- truth-values between "completely true" and "completely false". Formally, fuzzy logic is a structured, model-free estimator that approximates a function through linguistic input/output associations.

Fuzzy rule-based systems apply these methods to solve many types of "real-world" problems, especially where a system is difficult to model, is controlled by a human operator or expert, or where ambiguity or vagueness is common. A typical fuzzy system consists of a rule base, membership functions, and an inference procedure

A fuzzy expert system is an expert system that uses a collection of fuzzy membership functions and rules, instead of Boolean logic, to reason about data. The rules in a fuzzy expert system are usually of a form similar to the following:

if x is low and y is high then z = medium

where x and y are input variables (names for know data values), z is an output variable (a name for a data value to be computed), low is a membership function (fuzzy subset) defined on x, high is a membership function defined on y, and medium is a membership function defined on z. The antecedent (the rule's premise) describes to what degree the rule applies, while the conclusion (the rule's consequent) assigns a membership function to each of one or more output variables. Most tools for working with fuzzy expert systems allow more than one conclusion per

rule. The set of rules in a fuzzy expert system is known as the rule base or knowledge base.

Neural Networks

Artificial Neural Network is a system loosely modeled on the human brain. The field goes by many names, such as connection is, parallel distributed processing, neuro-computing, natural intelligent systems, machine learning algorithms, and artificial neural networks. It is an attempt to simulate within specialized hardware or sophisticated software, the multiple layers of simple processing elements called neurons. Each neuron is linked to certain of its neighbors with varying coefficients of connectivity that represent the strengths of these connections. Learning is accomplished by adjusting these strengths to cause the overall network to output appropriate results. The most basic components of neural networks are modeled after the structure of the brain. Some neural network structures are not closely to the brain and some does not have a biological counterpart in the brain. However, neural networks have a strong similarity to the biological brain and therefore a great deal of the terminology is borrowed from neuroscience.

2. RESUME

Application of this methods allow to us to modernize exists CAPP products in philosophy context of product lifecycle methods. Future CAPP systems will take up measure of real applicable of computer science in various industry areas. Next rising of computer technology will provide us another approaches for better mechanical engineering and manufacturing modeling, simulation and analyses before anything realization. Today, we know concurrent engineering, rapid prototyping, geometry modeling, mechanical analyses and other. But this is not end, just beginning of another new age in CA systems and technologies and their future building and development.

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