Skill Based Robot Control for Flexible Manufacturing Systems.

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Abstract

Assembly is one of the most complicated fields in a manufacturing process. Commonly, assembly cells are equipped with robots which mate the parts to be assembled by means of a high precise robot arm in addition to passive compliance elements, only. Advanced assembly robots make use of external sensors to cope with complicated situations and low tolerances in the assembly process. Complex assembly sequences can be devided into basic assembly operations (skills) such as "inserting" or screwing", Each skill is structured as a sequence of rules and can be activated by a special robot instruction. The complexity of interaction processes and their nonlinear attribute led us to the fuzzy reasoning method using fuzzy production rules. In the paper presented the structure of a skill subsystem using fuzzy rules is dicussed. Furthermore, a simple method of programming fuzzy production rules using "functions" is presented. Finally, the method was tested by the example "peg in hole insertion". By means of this skill operation a conventional insertion strategy is compared with a method based on fuzzy rules.

Keywords

Assembly; skills; robots; fuzzy reasoning

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