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Intelligent Robust Control of Redundant Smart Robotic Arm: QCOptKB - Quantum Computing KB Optimizer Supremacy

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In the first part of the report, we examined control systems with constant coefficients of the conventional PID controller (based on genetic algorithm) and intelligent control systems based on soft computing technologies. For demonstration, MatLab / Simulink models and a test benchmark of the robot manipulator demonstrated. Advantages and limitations of intelligent control systems based on soft computing technology discussed. Intelligent main element of the control system based on soft computing is a fuzzy controller with a knowledge base in it. In the first part of the article, two ways to implement fuzzy controllers showed. First way applied one controller for all links of the manipulator and showed the best performance. However, such an implementation is not possible in complex control objects, such as a manipulator with seven degrees of freedom (7DOF). The second way use of separated control when an independent fuzzy controller controls each link. The control decomposition due to a slight decrease in the
quality of management has greatly simplified the processes of creating and placing knowledge bases.
In the secund part of the report, to eliminate the mismatch of the work of separate independent fuzzy controllers, methods for organizing coordination control based on quantum computing technologies to create robust intelligent control systems for robotic manipulators with 3DOF and 7DOF described. Quantum supremacy of developed end-to-end IT design of robust intelligent control systems simulation demonstrated [2].

Summary

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