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POSITION CONTROL OF A SINGLE ARM MANIPULATOR USING GA-PID CONTROLLER

Amged S. El-Wakeel ⁽¹⁾ A.E. Elawa ⁽²⁾ Y.S. El-Koteshy ⁽³⁾

⁽¹⁾ Egyptian Armed Forces, Military Technical College, Cairo, Egypt.

⁽²⁾ Egyptian Armed Forces, Military Technical College, Cairo, Egypt.

⁽³⁾ Egyptian Armed Forces, Military Technical College, Cairo, Egypt.

Abstract

This paper demonstrates in detail how to employ the genetic algorithm (GA) optimization technique to search efficiently the optimal proportional-integral-derivative (PID) controller gains to control the position of a fixed arm manipulator system. The system identification technique is used to find an equivalent transfer function for the system under study. GA is applied off-line to find the optimal PID controller parameters based on the identified model. The experimental and simulation results of the actual system and its identified model under the influence of the optimal PID controller are explored. The proposed approach shows superior features, including easy implementation, stable convergence characteristic, and good computational efficiency.

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Fixed arm manipulator system, System identification, Genetic algorithm, PID controller

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GA optimization technique, PID controller parameters, Computational efficiency

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