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A Comprehensive Study of Discrete PID Controller for DC Motor Speed Control Using MATLAB

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Abstract: *This paper presents a comprehensive study on the design and implementation of a discrete Proportional-Integral-Derivative (PID) controller for DC motor speed control using MATLAB. The discrete PID controller is suitable for digital control systems and microcontroller-based implementations. The paper outlines the steps involved in designing and tuning the PID controller parameters, including the selection of appropriate tuning methods and the evaluation of performance metrics. Extensive simulations using a realistic DC motor model implemented in MATLAB are conducted to validate the effectiveness of the proposed controller. The results are compared with alternative control strategies to highlight the advantages of the PID controller. The findings and insights from this study contribute to the broader understanding and practical application of control theory in DC motor speed control systems.*

Keywords: DC motor, speed control, PID controller, discrete-time control, MATLAB etc

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