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A Digitally Controlled Drive System for Travelling-wave Ultrasonic Motor

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Abstract: A digitally controlled drive system was implemented in this study to control the speed and direction of a travelling-wave ultrasonic motor. The drive system, based on a 2-phase voltage-fed high-frequency serial-resonant inverter, uses the mechanical resonant frequency of an ultrasonic motor. A TMS320F243 digital signal processor was used to control an ultrasonic motor drive system. The speed control of the ultrasonic motor was achieved with a driving frequency in the 41.3-43.3 kHz frequency range. The feasible evaluations of the proposed drive and control system were tested by experiments. Experimental results demonstrated that the proposed drive and control system is flexible and highly effective for the speed and direction control of a travelling-wave ultrasonic motor.

Key Words: Ultrasonic motor, digital control, speed control, digital signal processor

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