

Autonomous Control of Ultrasonic Transducer Drive System

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Abstract : In order to automatically operate the ultrasonic transducer drive system for sonicating aluminum, this paper proposes the ultrasonic transducer sensorless control algorithm. The resonance frequency shift and electrical impedance change is a common phenomenon in the state of the ultrasonic transducer. The proposed control algorithm make use of the impedance change of ultrasonic transducer according to the environment between air state and aluminum alloy state, it controls the ultrasonic transducer drive system autonomous without a sensor. The proposed sensorless autonomous ultrasonic transducer control algorithm was experimentally verified using a 3kW prototype ultrasonic transducer drive system.

Keywords : ultrasonic transducer drive system, impedance change, sensorless, autonomous control algorithm

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