عنوان مقاله:

design and simulation of a new controller for resonant operation of piezoelectric ultrasonic tools

محل انتشار:

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خلاصه مقاله:

Many ultrasonic tools are excited by piezoelectric elements. Most often, resonant vibration is required to achieve maximum energy transformation. Resonance frequency, however, varies when mechanical environment of piezo changes so we need a controller which can tune frequency of driver to resonance frequency. In this paper a voltage resonant inverter is presented which is controlled by a new frequency controller. Conventional frequency controllers are based on PLL theory and tune frequency by using a phase detector and VCO. They change frequency until phase detector output becomes zero. Instead, this controller tends to change the drive frequency so that the reactive component of current approaches to zero and uses S&H and VCO circuit. The system that has been combined with an inverter and so called controller, has been simulated in ORCAD and found very suitable for simulation application because of its simplicity. Also response time of this controller to load change is in the shorter range in compare with conventional PLL controller.

کلمات کلیدی:

Frequency controller, Resonance inverter, piezoelectric, Ultrasonic, Simulation, Orcad, PLL