

압전 변압기의 제어 방식에 따른 모델링 및 안정화분석

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Stabilization Analysis of Piezo-electric Converter for PFM and PWM Control

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Abstract : Recently, demands for the development of compact, lightweight power supplies with higher power density and higher efficiency have been increased. Since Piezoelectric Transformer (PT) was emerged in device and material industry, it has been suggested as a viable alternative to the magnetic transformer in some applications. PT has some advantages such as low profile and mechanical energy transfer with little electromagnetic interface (EMI). Also, PT can provide high voltage stepping ratio with good isolation and requires no copper windings saving copper usage especially for large voltage conversion differences. Conventional control of PT converter has mainly two-way. One is the pulse frequency modulation (PFM) control method and the other is the pulse width modulation (PWM) control with frequency fixed method. It is known that the maximum PT efficiency can be obtained when it operates near the resonant frequency of the PT. And, also PT's resonant frequency moves according to the load condition. Therefore, selection of PT converter control method is very difficult. This paper analyzes general piezo-electric converter modeling and proposes a guide-line to selection of control method and stabilization control.

Key Words : Piezo-electric transformer, PWM control, PLL control, converter