World Academy of Science, Engineering and Technology
International Journal of Mechanical and Mechatronics Engineering
Vol:8, No:08, 2014

A Study on Unidirectional Analog Output Voltage Inverter for Capacitive Load

Authors : Sun-Ki Hong, Nam-HeeByeon, Jung-Seop Lee, Tae-Sam Kang

Abstract : For Common R or R-L load to apply arbitrary voltage, the bridge traditional inverters don't have any difficulties by PWM method. However for driving some piezoelectric actuator, arbitrary voltage not a pulse but a steady voltage should be applied. Piezoelectric load is considered as R-C load and its voltage does not decrease even though the applied voltage decreases. Therefore it needs some special inverter with circuit that can discharge the capacitive energy. Especially for unidirectional arbitrary voltage driving like as sine wave, it becomes more difficult problem. In this paper, a charge and discharge circuit for unidirectional arbitrary voltage driving for piezoelectric actuator is proposed. The circuit has charging and discharging switches for increasing and decreasing output voltage. With the proposed simple circuit, the load voltage can have any unidirectional level with tens of bandwidth because the load voltage can be adjusted by switching the charging and discharging switch appropriately. The appropriateness is proved from the simulation of the proposed circuit.

Keywords : DC-DC converter, analog output voltage, sinusoidal drive, piezoelectric load, discharging circuit
Conference Title : ICEME 2014 : International Conference on Electrical and Mechatronics Engineering
Conference Location : Amsterdam, Netherlands
Conference Dates : August 07-08, 2014