

## Digital Control Algorithm Based on Delta-Operator for High-Frequency DC-DC Switching Converters

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**Abstract :** In this paper, a digital control algorithm based on delta-operator is presented for high-frequency digitally-controlled DC-DC switching converters. The stability and the controlling accuracy of the DC-DC switching converters are improved by using the digital control algorithm based on delta-operator without increasing the hardware circuit scale. The design method of voltage compensator in delta-domain using PID (Proportion-Integration- Differentiation) control is given in this paper, and the simulation results based on Simulink platform are provided, which have verified the theoretical analysis results very well. It can be concluded that, the presented control algorithm based on delta-operator has better stability and controlling accuracy, and easier hardware implementation than the existed control algorithms based on z-operator, therefore it can be used for the voltage compensator design in high-frequency digitally- controlled DC-DC switching converters.

**Keywords :** digitally-controlled DC-DC switching converter, digital voltage compensator, delta-operator, finite word length, stability

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