DC-DC 変換器のデルタシグマ変調器による制御

DC-DC Converter Controlled by Delta-Sigma Modulator

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The DC-DC converter plays a critical role in the power management system in keeping long battery life while providing stable power supply and noise isolation. We applied delta-sigma modulators to control DC-DC switching converters in place of the usual PWM. We make simulations and the results are as follows: (1) Compared to converter controlled by PWM, converter controlled by ΔΣ shows faster transient response and better noise-shaping characteristics. (2)We propose to use a continuous-time feed-forward-type ΔΣ controller (Fig.1) in DC-DC converter and simulation results show that the transient response is faster compared with a feedback-type ΔΣ controller case.　(3) Simulation results also show that a second-order ΔΣ controller is superior to the first-order one in faster transient response and better noise-shaping characteristics.

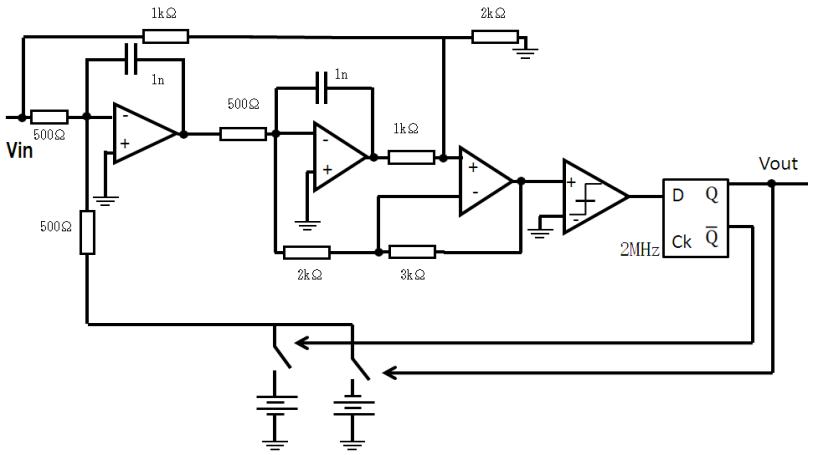

Fig.1. Schematics of the proposed second order continuous-time feed-forward-typeΔΣ controller