

System and Method for controlling Average Current digitally

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ABSTRACT

The present disclosure provides a system (100A) for controlling digital average current mode. The system (100A) includes a boost converter (102). The boost converter (102) comprises a pair of switches (S1, S2) when activated, enables sampling of an inductor current and an output voltage of the boost converter (102). The boost converter (102) comprises an instrumentation amplifier (104) configured to provide an equivalent voltage corresponding to the sampled inductor current (i_L). The system (100) includes a first voltage loop converter (110) configured to receive a first error voltage. The system (100) includes a second voltage loop controller (116) configured to receive a second error voltage. The system (100) includes a first comparator (118) configured to compare the second error voltage and a reference pulse (VR) to receive a binary output (u). The system (100) includes a clock generator (122) for generation of sampling clock.

KEY APPLICATION AREAS

- 1.Power Electronics & Switching Converters.
- 2.Digital Power Management.
- 3.DC-DC Boost Converter Control.
- 4.Battery Charging Systems.
- 5.Renewable Energy Power Conversion.
- 6.Industrial Power Supplies.

POTENTIAL USE

1. Digital average current control for DC-DC boost converters with improved accuracy and noise immunity.
2. High-efficiency battery chargers for EVs and portable electronic devices.
3. Solar PV and renewable energy converters requiring precise current regulation.
4. Switched-mode power supplies (SMPS) with stable current and voltage control.
5. Digital control of industrial power converters with reduced computational complexity and improved stability.
6. Telecom and data center power systems requiring efficient and reliable power conversion.
7. Embedded digital controller implementation for real-time current sensing and converter regulation.