

# **An Efficient Digital Sliding Controller for Adaptive Power Supply Regulation**

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## **ABSTRACT**

An efficient digital sliding controller for adaptive power supply regulation is presented. A widely used technique for switching power supplies is analog sliding control, and it is known for its robust stability and fast transient response. However, adaptive power supply control tries to regulate the delay and favors a digital controller over conventional analog controllers, which regulate the voltage. A novel reformulation of the sliding control law enables a simple digital implementation that also integrates the reference circuit into the sensor. The digital sliding controller operates at the regulated variable supply, so its power dissipation also scales. The prototype chip fabricated in 0.25- $\mu\text{m}$  CMOS technology demonstrates a power efficiency of 89-95% over the regulated voltage range of 1.1V-2.3V.