A Simple Feed-Forward Controller Design for DC-DC Buck Converter

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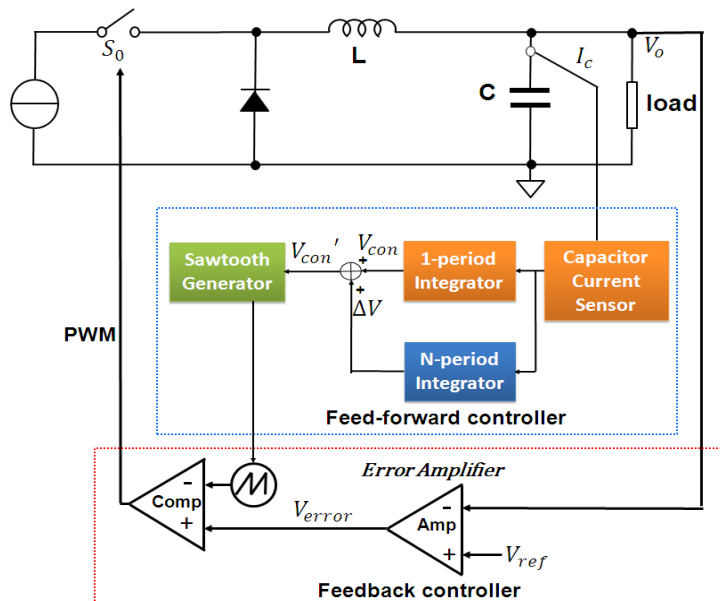*Electronic Engineering Department, Gunma University, JAPAN*

Research Objective

A **simple** and **effective** feed-forward controller

Simple → applicable to dual-output converter

Effective → cross-regulation is improved

Principle

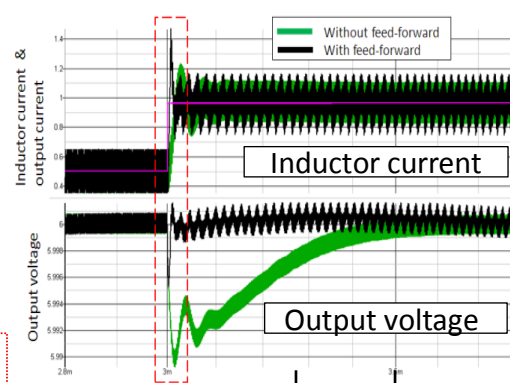Modulate **sawtooth** signal based on **charge balance** of output capacitor

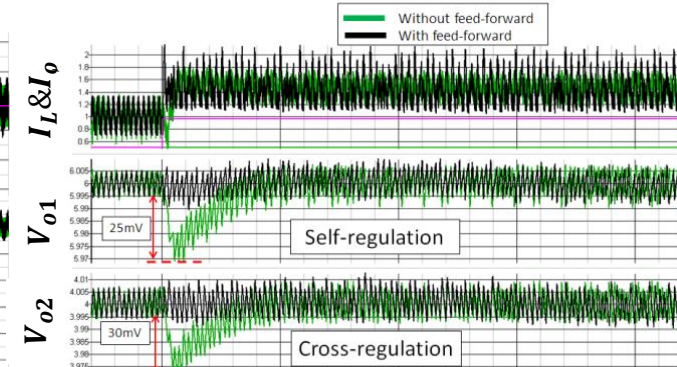Fast transient response

Single-Output Buck Converter

V_o: $6V$
I_o: $0.5A \rightarrow 1A$

Feed-forward	With	Without
Under-shoot	5mV	11mV
Response time	8µ s	500µ s

Dual-Output Buck Converter

V_{o1}: $6V$, V_{o2}: $4V$
I_{o1}: $0.5A \rightarrow 0.96A$ I_{o2}: $0.5A$

Feed-forward	With	Without
Self-regulation	--	25mV
Cross-regulation	--	30mV