**Feed-forward Controller for DC-DC Buck Converter**

**System Block Diagram**

- **Sawtooth Generator**
- **Current Sensor & Integrator**
- **Multi-period Integration Compensation**

**Simulation**

- **SISO Buck Converter**
  - 1st order: \( I_{L1} = 0.54 \rightarrow 1 \) A
  - With feed-forward: \( 11 \) mV
  - Without feed-forward: \( 500 \) µV

- **SIDO Buck Converter**
  - 2nd order: \( I_{L2} = 0.964, I_{L2} = 0.54 \) A
  - With feed-forward: \( 25 \) mV
  - Without feed-forward: \( 76 \) mV

**Summary**

- **Simple Design:**
  - Only output capacitor current is detected
  - Digital nonlinear calculation is NOT required
  - ADC, DSP are NOT required
  - Applicable to SIDO converter
  - Cost-effective

- **Enhanced Performance:**
  - Transient response is significantly improved
  - Cross-regulation of SIDO converter is improved

**Reference**