

Modified Fibonacci Switched Capacitor Converter with Reduced Switch Stress and Increased Efficiency

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ABSTRACT

Researchers at the University of California, Davis have developed a technology that introduces an alternative topology for Fibonacci switched-capacitor converters that significantly reduces switch losses and improves efficiency.

FULL DESCRIPTION

This technology modifies the wiring connections of a conventional Fibonacci switched-capacitor converter to create an alternative configuration. By changing one switch connection per capacitor, it achieves a reduction in losses and an increase in efficiency without needing additional parts. This alternative topology can maintain the same conversion ratio as the conventional approach in both step-up and step-down configurations, while offering up to a 38% reduction in total switch losses and enhanced efficiency.

APPLICATIONS

- ▶ DC-DC converters for 48 Volt to point-of-load applications.
- ▶ Systems requiring minimal Electromagnetic Interference (EMI) and high-power density.
- ▶ Applications demanding full integration and fixed output voltage ratios.

FEATURES/BENEFITS

- ▶ Significant reduction in switch losses.
- ▶ Increased efficiency compared to conventional Fibonacci converters.
- ▶ No additional parts are required, only a modification of wiring connections.
- ▶ Maintains the same conversion ratio in both step-up and step-down configurations.
- ▶ Less switch stress, leading to potentially longer component lifespan.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20250219524	07/03/2025	2024-523

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OTHER INFORMATION

KEYWORDS

alternative configuration, efficiency, energy storage, Fibonacci converter, power conversion, switched-capacitor converter, reduction in losses, switch stress, voltage conversion, wiring configuration

CATEGORIZED AS

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