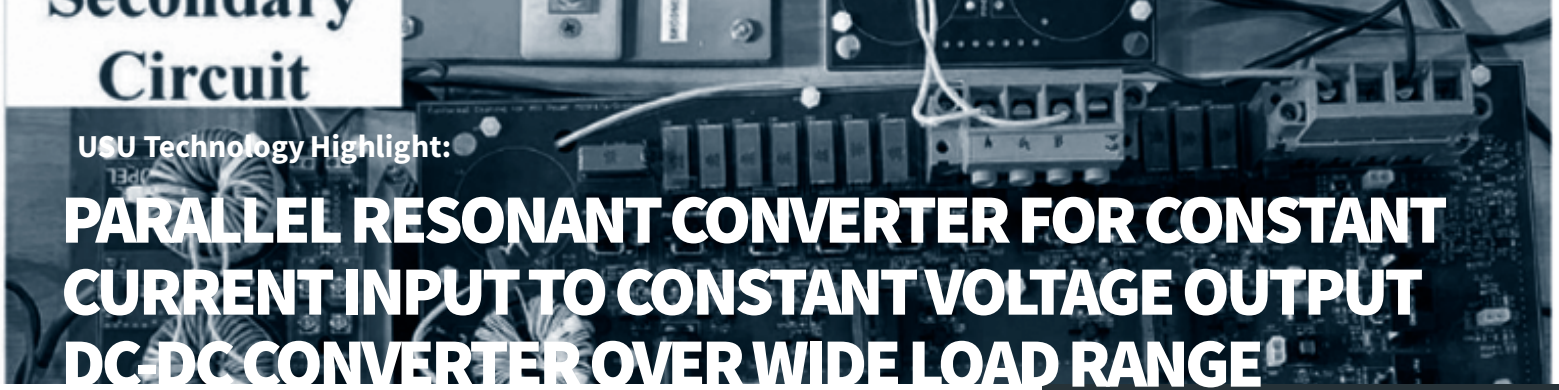

USU Technology Highlight:

PARALLEL RESONANT CONVERTER FOR CONSTANT CURRENT INPUT TO CONSTANT VOLTAGE OUTPUT DC-DC CONVERTER OVER WIDE LOAD RANGE

PROBLEM

Resonant power converters are widely used in various applications including DC distribution systems, bi-directional DC-DC converters, wireless power transfer systems, and underwater telecommunication and observation systems due to their soft-switching ability, low electromagnetic interference, and high-power density. In underwater systems, a constant DC current is preferred over DC voltage distribution for its robustness against cable impedance and faults. However, the input voltage range and voltage ratings within a current-fed converter may be high, increasing cost, and component voltage ratings impact a range of output voltages.

SOLUTION

This new converter establishes a constant output voltage for a range-varying load, and addresses the operational challenge with a constant-current input source to achieve a minimum-power operation limit. The converter reduces the overall component stress and operates with multiple output voltage converters fed from a constant current source, enabling a wider set of output voltage functionalities. The technology converts current into voltage through an inductive power transfer topology with a zero-volt switch, achieving a constant DC current input and load-independent output voltage with fewer components in the circuit, suitable for low-current and high-voltage systems, operating at high switching frequency to achieve high efficiency with low electromagnetic interference. The converter is capable of bidirectional operation.

BENEFITS

The circuit behaves as a programmable output power source. The load impedance or resistance can be modified to the situation, accommodating a varying power source with a constant output voltage. The system is directly integrable with constant DC current distributions for underwater applications and vehicle charging applications.

CONTACT

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DEVELOPMENT STAGE

TRL 4

LICENSING

Available for License

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WEBSITE

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