

PLECS

DEMO MODEL

Cuk Converter

Last updated in PLECS 4.3.1

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1 Overview

This example demonstrates an unregulated, non-isolated Ćuk converter.

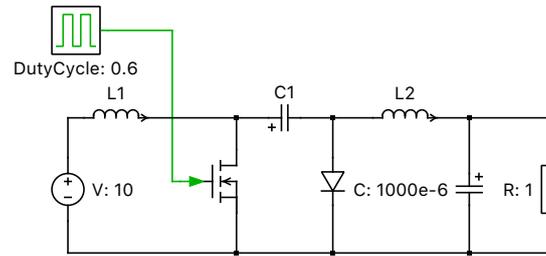


Figure 1: Ćuk converter

2 Model

The Ćuk converter is a DC/DC converter which, like a buck-boost topology, can be configured to produce an output voltage either lower or higher than the input voltage. However, it always produces an output voltage whose polarity is opposite of that of the input.

The non-isolated Ćuk converter uses a capacitor for energy storage, rather than an inductor like most switched-mode supply topologies.

The converter has an ideal transfer function of:

$$\frac{V_{\text{out}}}{V_{\text{in}}} = \frac{-D}{1-D}$$

where D is the duty cycle.

This means that a duty cycle value of 0.5 will create a unity gain of 1 with opposite polarity, and values higher or lower than 0.5 will step-up or step-down the output voltage, respectively.

3 Simulation

Run the simulation with the model as provided to view the signals and verify that the load voltage has an absolute magnitude of:

$$V_{\text{in}} \cdot \frac{0.6}{1-0.6} = 10 \text{ V} \cdot \frac{3}{2}$$

or approximately 15 V.

Revision History:

PLECS 4.3.1 First release

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PLECS Demo Model

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