

CASPOC

A Simulation Experience

Power Electronics Example Package

90+ Examples with questions

Questions and remarks

- Load example: **FULLB_1.CSI**. Start the simulation. In this circuit the capacitor C_3 is omitted.
- What happens if the average of V_{L1} is unequal to zero.
- Place a capacitor in series with the primary winding of the transformer as indicated in the figure, by loading the file **FULLB_2.CSI**, and notice the difference in the voltage across the inductor L_1 .
- Calculate the average V_{L1} .
- Calculate the output voltage as function of the input voltage.
- Calculate the value of C_3 . Note that the switching frequency must be higher the resonant frequency, $f_s > f_0$.

$$f_0 = \frac{1}{2\pi \sqrt{\left(\frac{N_p}{N_s}\right)^2 * L_f * C_3}} \Rightarrow C_3 = \frac{1}{4\pi^2 * f_0^2 * \left(\frac{n_p}{n_s}\right)^2 * L_f}$$

Educational Power Electronics Simulation & Animation Examples

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Power Electronics Example Package

Explore the world of Power Electronics and Electrical Drives using Caspoc. This Educational Example Package contains more than 90 preprogrammed examples of Power Electronics simulations for CASPOC. The examples include schematic, printed simulation results and educational questions and remarks on the example.

1-PHASE RECTIFIERS

1-phase diode rectifier
1-phase diode rectifier with inductive load
1-phase thyristor
1-phase diode bridge rectifier
1-phase half-controlled symmetrical bridge
1-phase half-controlled asymmetrical bridge

1-phase thyristor rectifier bridge
1-phase triac converter

3-PHASE RECTIFIERS

3-phase one sided thyristor bridge
3-phase half-controlled symmetrical bridge
3-phase thyristor bridge
3-phase diode bridge
3-phase triac converter

DC-DC CONVERTERS

boost converter
buck converter
buck-boost converter
2-quadrant converter
cuk converter
conventional chopper
bipolar switching dc-dc converter
unipolar switching dc-dc converter

RESONANT CONVERTERS

series resonant circuit
parallel resonant circuit
voltage-source series resonant converter
current-source parallel resonant converter
single-ended resonant dc/dc converter
resonant converter below the resonant frequency
resonant converter above the resonant frequency
series-loaded resonant converter
series-loaded resonant con. below resonant frequency
series-loaded resonant con. above resonant frequency
parallel-loaded resonant converter
parallel-loaded resonant con. below resonant freq.

parallel-loaded resonant con. above resonant freq.
zero-current-switching, quasi-res buck converter
zero-current-switching, quasi-res boost converter
zero-voltage-switching, quasi-res buck converter

SWITCH MODE DC POWER SUPPLIES WITH ISOLATION

forward dc/dc converter
flyback dc/dc converter
flyback parallel converter
forward 2 transistor dc/dc converter
flyback 2 output dc/dc converter
flyback 2 transistor dc/dc converter
current-source dc-dc converter
push-pull converter
full-bridge circuit
half-bridge circuit

DC TO AC INVERTERS

1-phase GTO DC-to-AC inverter
1-phase parallel inverter
1-phase current source inverter
mc Murray inverter
current-source inverter
voltage-source inverter
AC/AC CONVERTERS
dc-link converter with current storage
dc-link converter with voltage storage
dc-link converter with energy storage
6-pulse cycloconverter

TRANSFORMERS

1-phase transformer
triangle to star transformer
star to triangle transformer
star to triangle transformer
triangle to triangle transformer

DRIVES

direct current machine
direct current machine with chopper drive
induction machine
current-source inverter with induction machine
voltage-source inverter with induction machine
CIRCUIT WITH CONTROLLER
switching of two capacitors
forward converter-feedback compensation
1-phase LC filter
3-phase LC filter
1-phase thyristor-controlled inductor for static var control
3-phase thyristor-controlled inductor for static var control
3-phase switch-mode static var controller
1-phase active filter
1-phase sinusoidal input current rectification
1-phase switch mode for a bidirectional powerflow
3-phase vector diagram
equivalent series resistance
second order system
diode snubber circuit
RMS and average calculation
flyback converter with voltage/current mode control
BUCK CONVERTER WITH CONTROLLER
buck current-mode control
buck current/voltage-mode control
buck P-I control
buck hysteresis control
buck converter with diode bridge and pwm controller
buck converter with diode bridge and amplitude mod.
buck converter with pwm controller

The Power Electronics Example package is included in the Educational Version in electronic form. A printed version can be ordered additionally.

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