

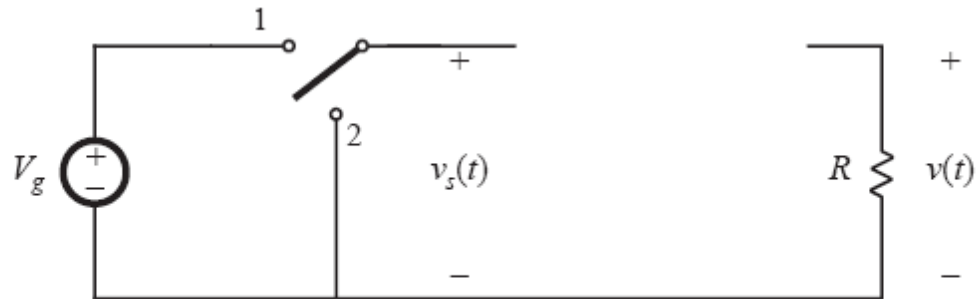


Análisis estático de convertidores



Convertidor Reductor

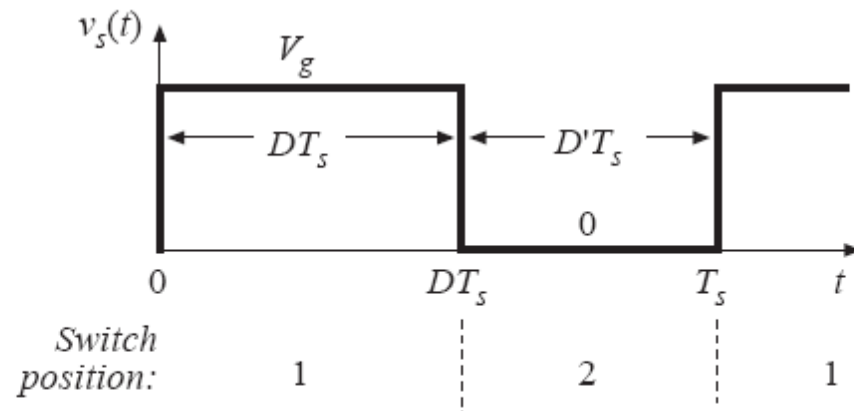
SPDT switch changes dc component



Switch output voltage waveform

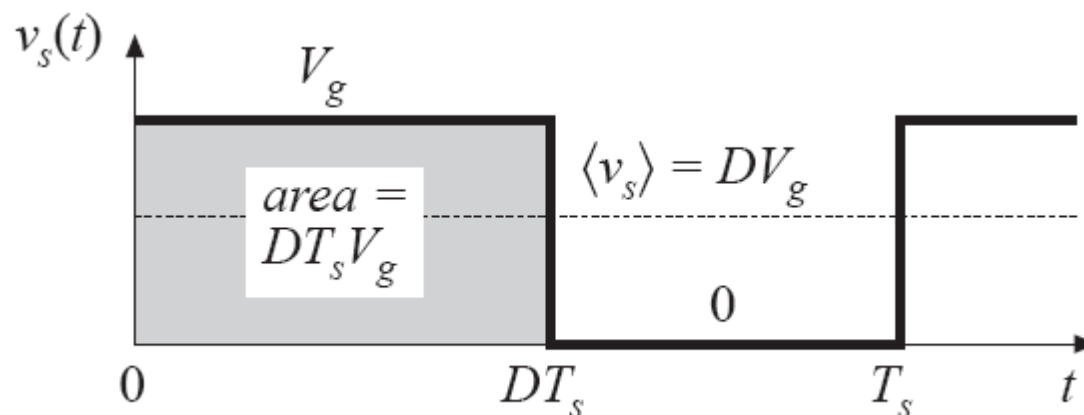
Duty cycle D :
 $0 \leq D \leq 1$

complement D' :
 $D' = 1 - D$





Componente de continua de la tensión en el interruptor



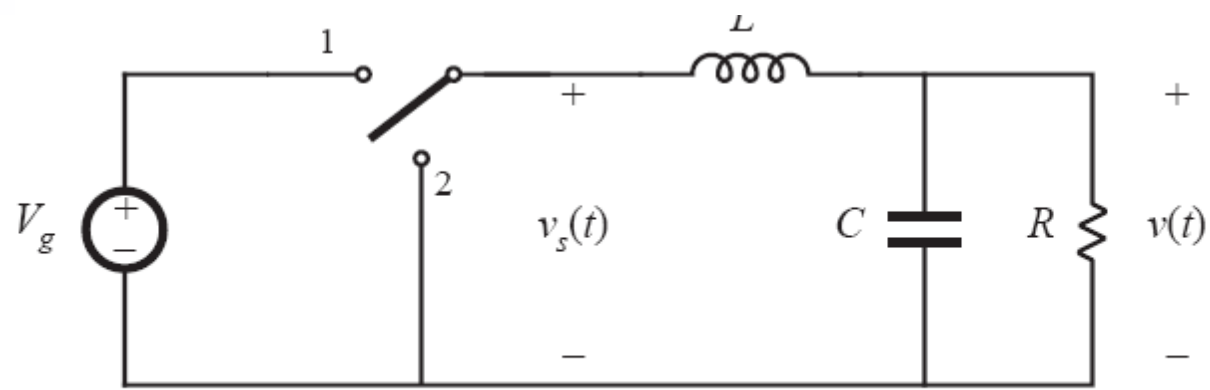
Fourier analysis: Dc component = average value

$$\langle v_s \rangle = \frac{1}{T_s} \int_0^{T_s} v_s(t) dt$$

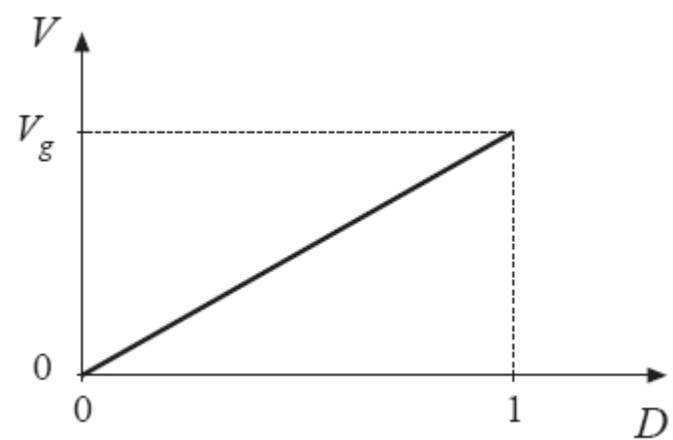
$$\langle v_s \rangle = \frac{1}{T_s} (DT_s V_g) = DV_g$$



Filtro sin pérdidas para eliminar armónicos de alta frecuencia



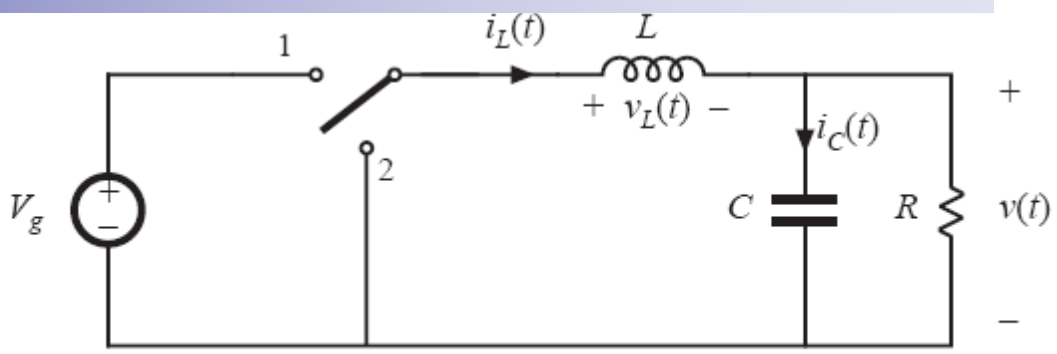
$$v \approx \langle v_s \rangle = DV_g$$





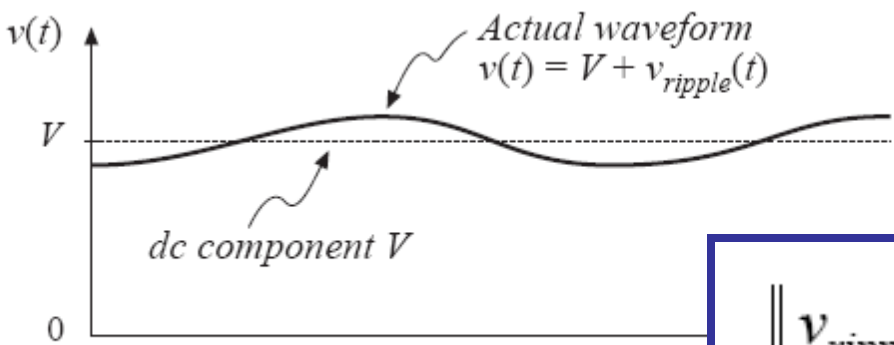
Principio de pequeño rizado

*Buck converter
containing practical
low-pass filter*



*Actual output voltage
waveform*

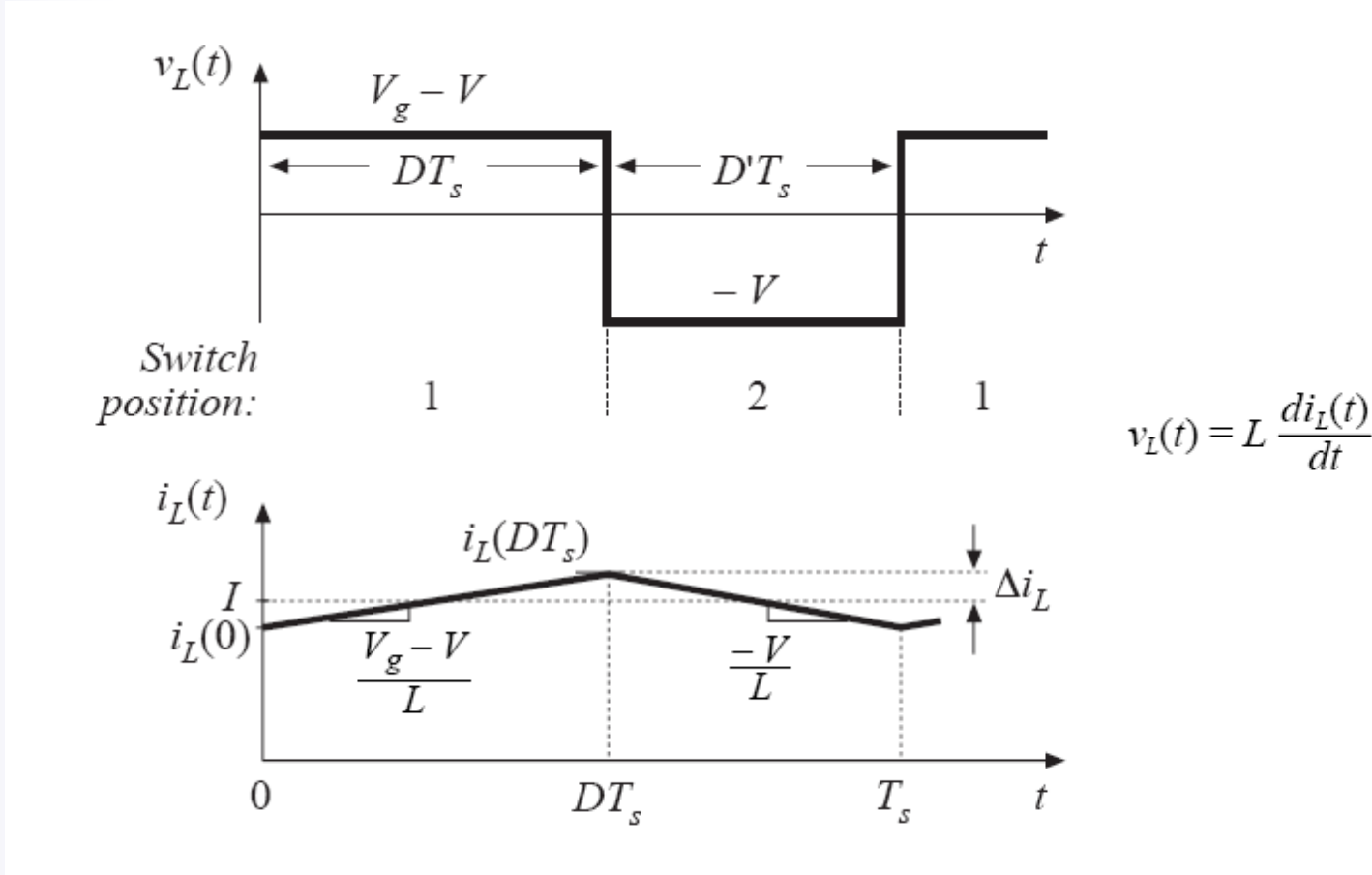
$v(t) = V + v_{ripple}(t)$



$$\| v_{ripple} \| \ll V$$
$$v(t) \approx V$$

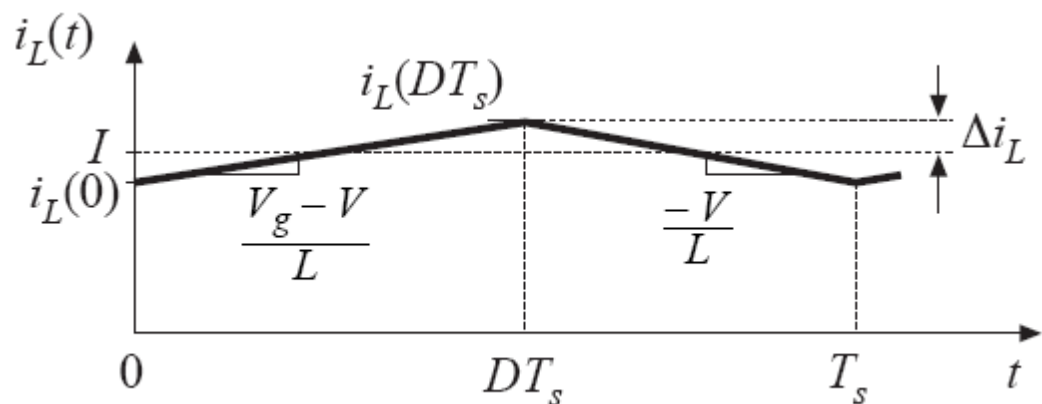


Balance voltios-segundo en la bobina





Rizado de corriente (Aproximación de rizado lineal)



(change in i_L) = (slope)(length of subinterval)

$$(2\Delta i_L) = \left(\frac{V_g - V}{L}\right) (DT_s)$$

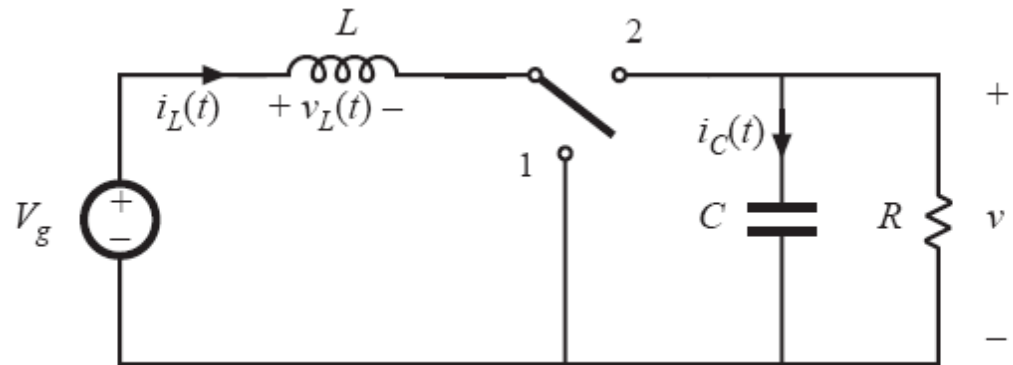
$$\Rightarrow \Delta i_L = \frac{V_g - V}{2L} DT_s$$

$$L = \frac{V_g - V}{2\Delta i_L} DT_s$$

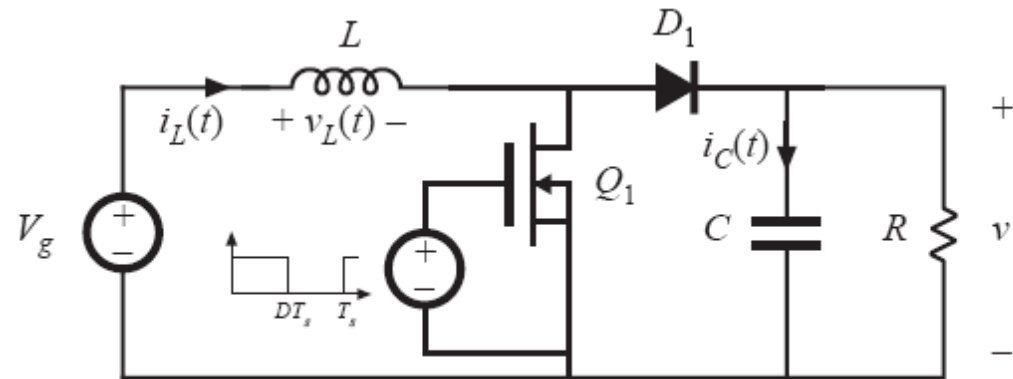


Convertidor Boost

*Boost converter
with ideal switch*



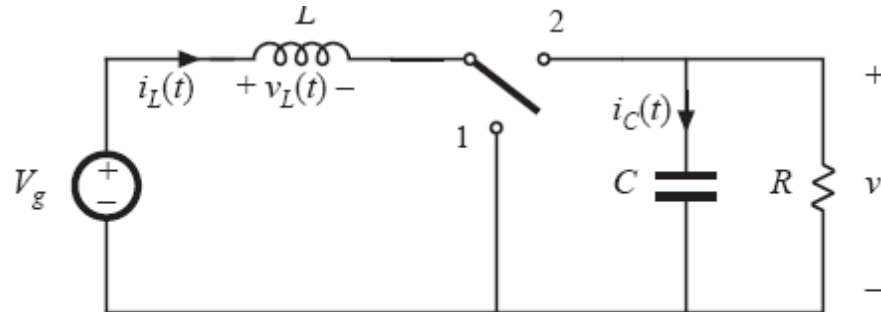
*Realization using
power MOSFET
and diode*



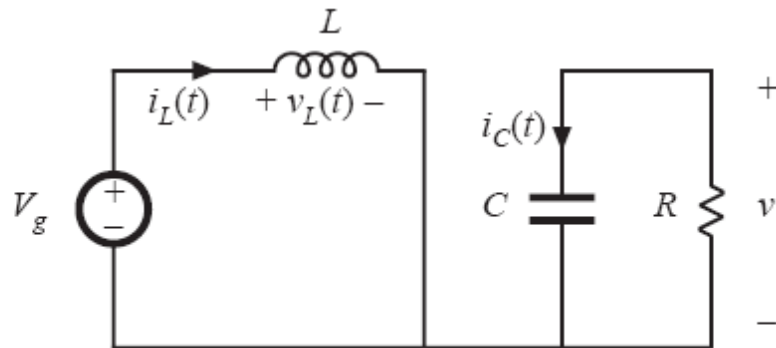


Convertidor Boost

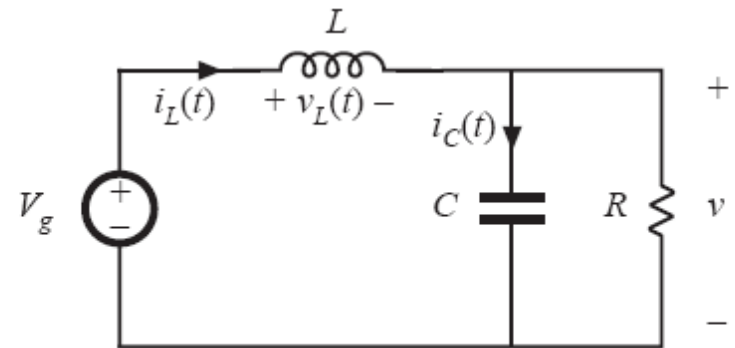
original
converter



switch in position 1



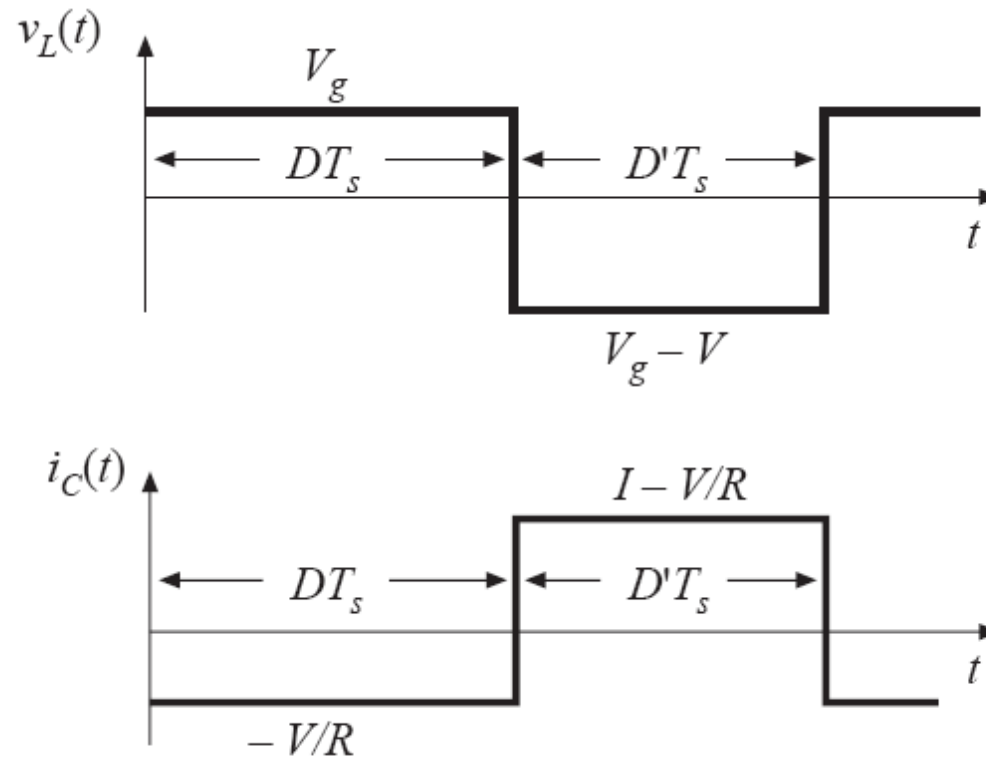
switch in position 2





Convertidor Boost

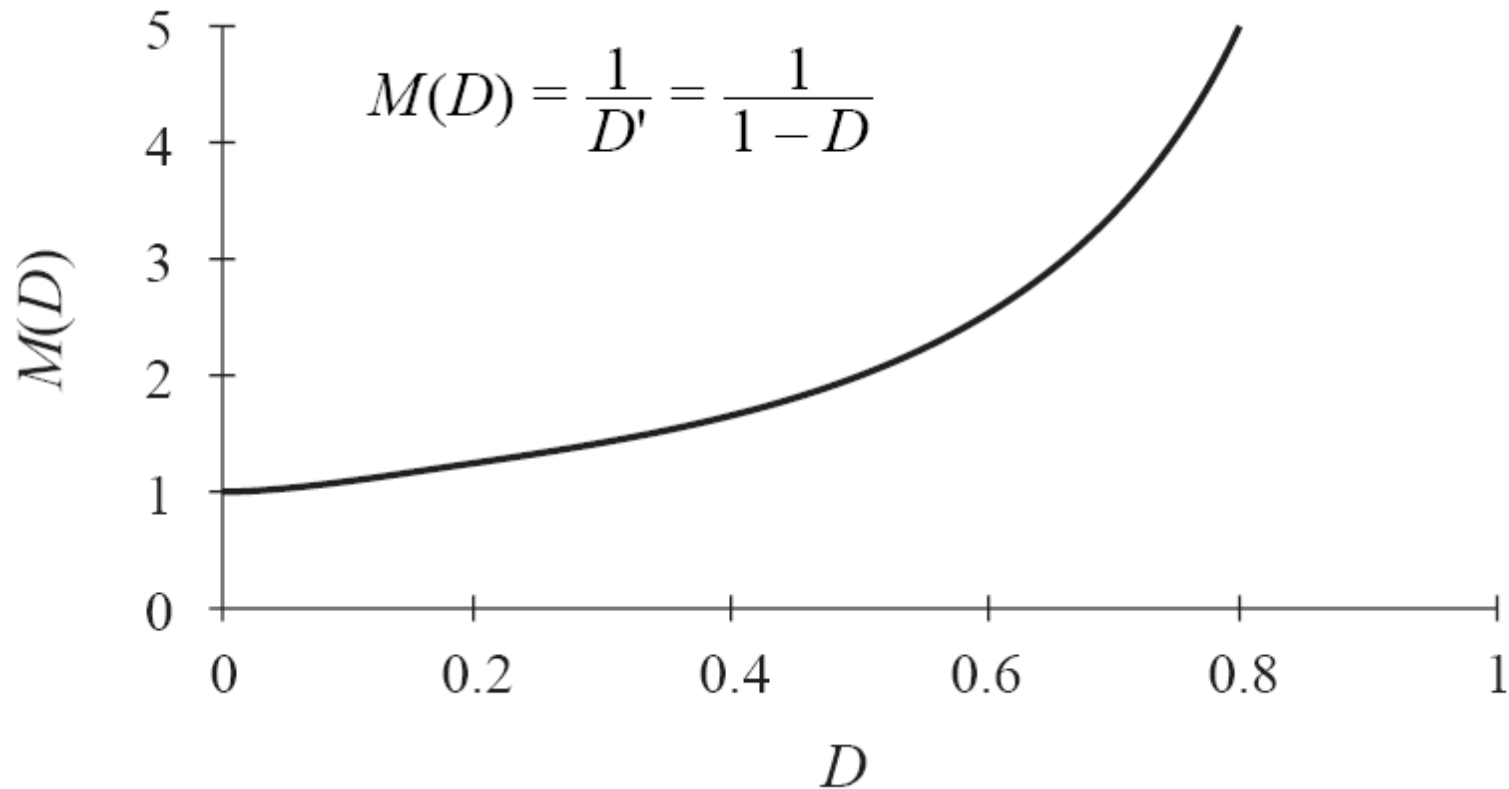
Formas de onda de tensión y corriente





Convertidor Boost

Relación de conversión

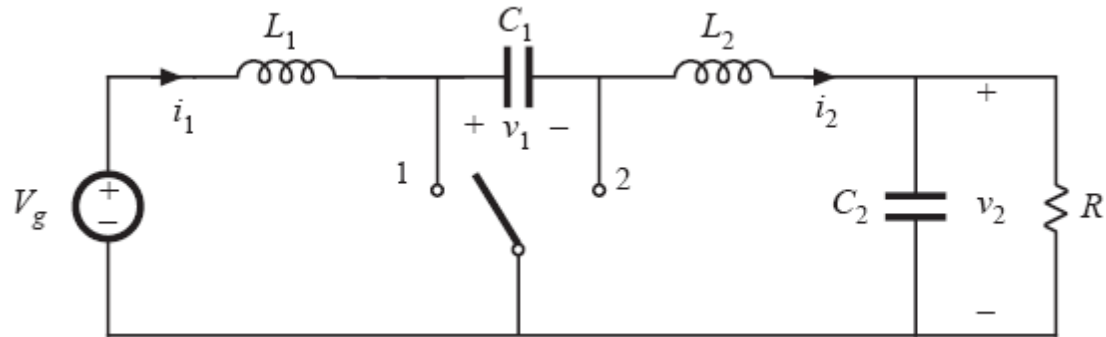




Convertidor Cuk

Esquemático

*Cuk converter,
with ideal switch*



*Cuk converter:
practical realization
using MOSFET and
diode*

