

Fuentes Conmutadas

GRUPO 12

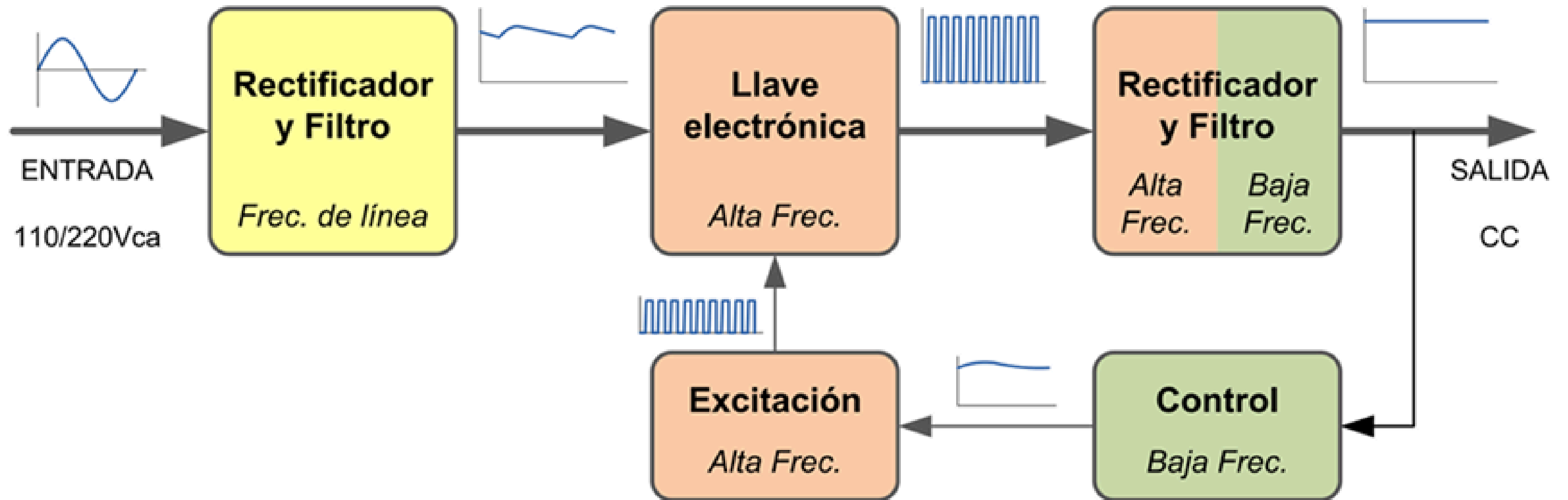
BELLINI - BERMAN - SAITTA

¿POR QUÉ UTILIZARLAS?

- Alto rendimiento.
- Ripple de fácil filtrado.
- Amplio rango de tensión de entrada.
- Tamaño y peso reducido.
- Bajo costo.

FUENTES CONMUTADAS

DIAGRAMA EN BLOQUES DE FUENTE CONMUTADA

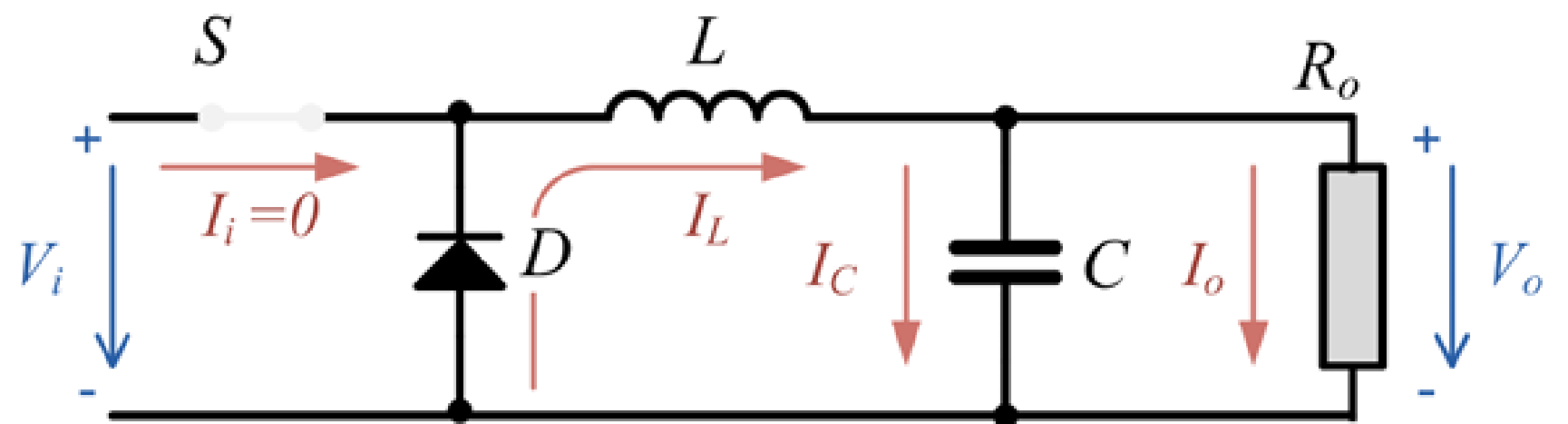
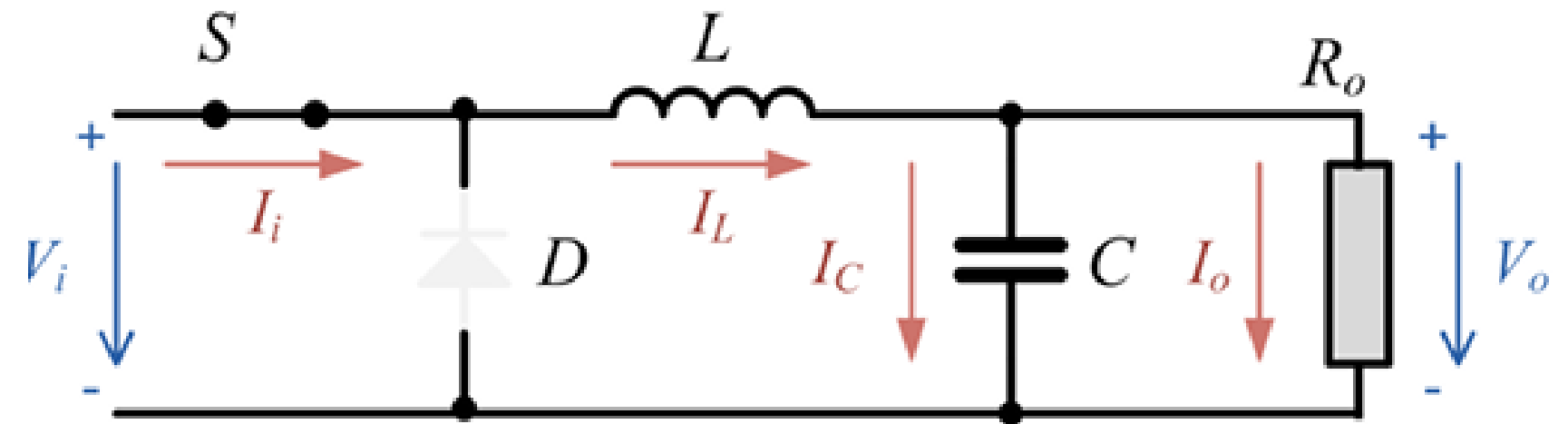
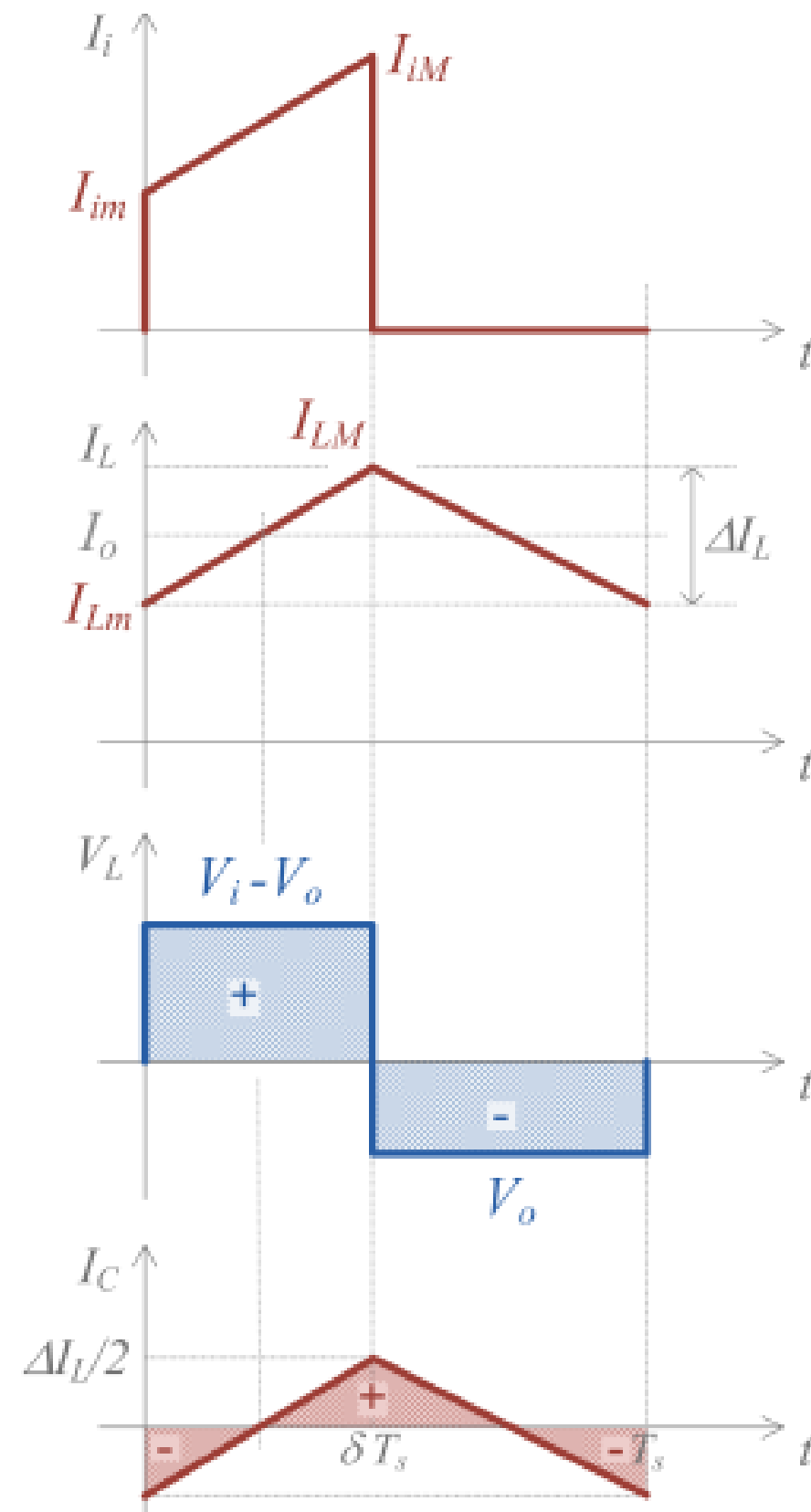


CONSIDERACIONES

- Elemento de conmutación como llave ideal.
- Elementos pasivos ideales.
- No existen pérdidas.
- Ripple despreciable.
- Entrada constante.
- Régimen estacionario.

CONVERTIDOR BUCK

Conducción continua o ininterrumpida

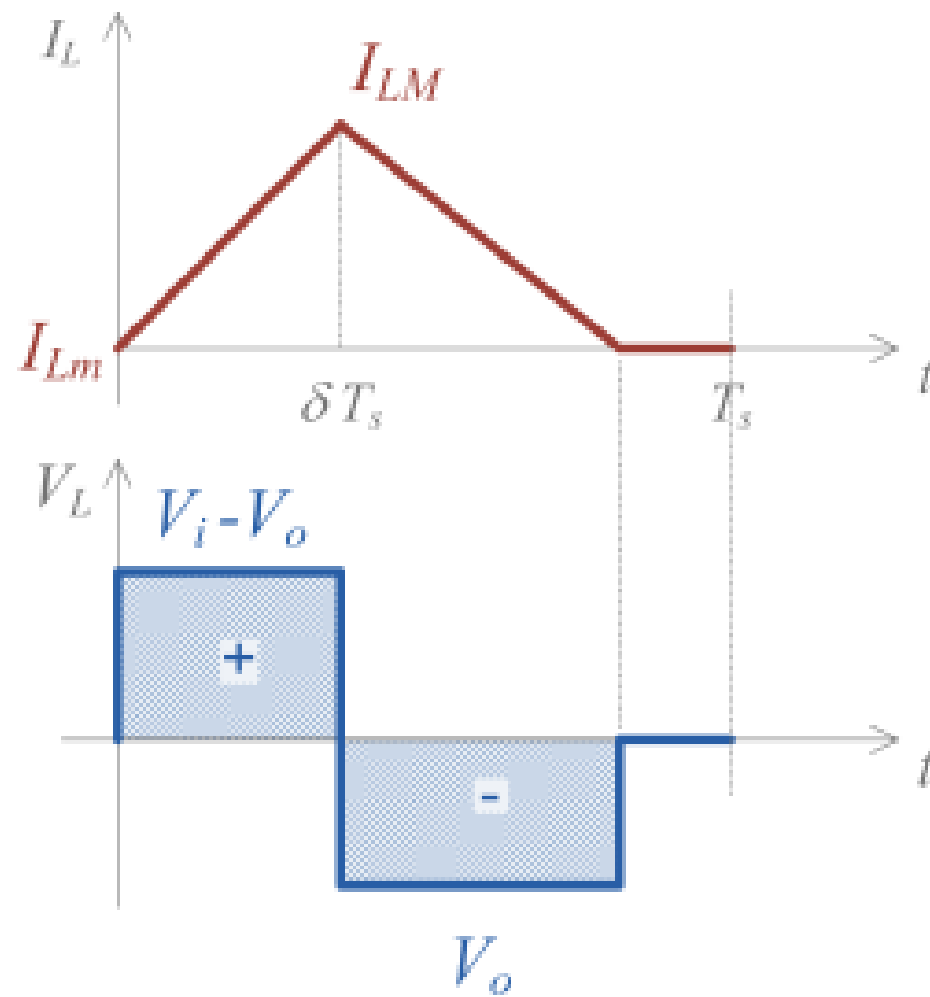


$$(V_i - V_o) \cdot \delta T_s = V_o \cdot (1 - \delta) T_s$$

$$V_o = \delta V_i$$

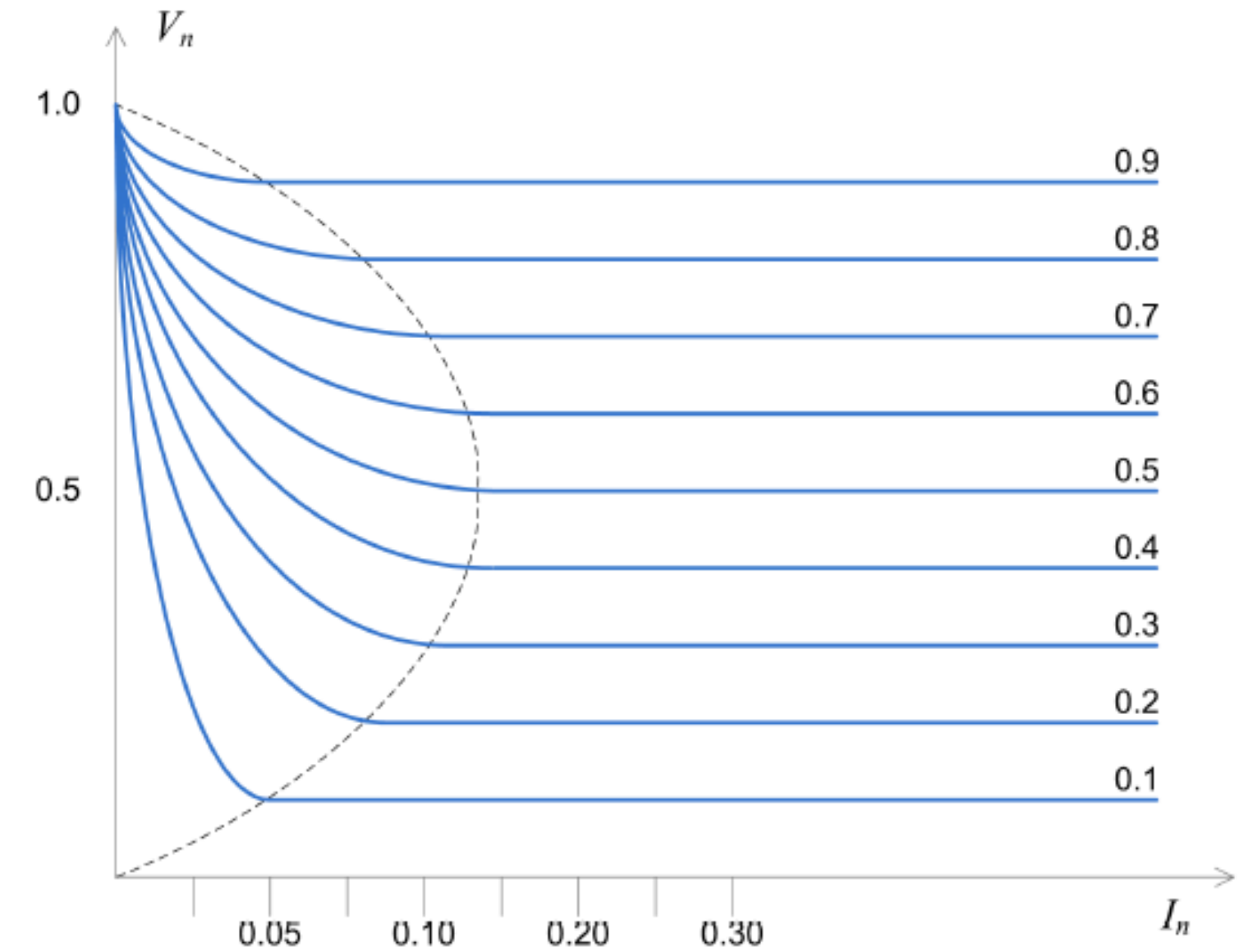
CONVERTIDOR BUCK

Conducción discontinua o interrumpida



$$R_{oM} = \frac{2L}{(1-\delta)T_s}$$

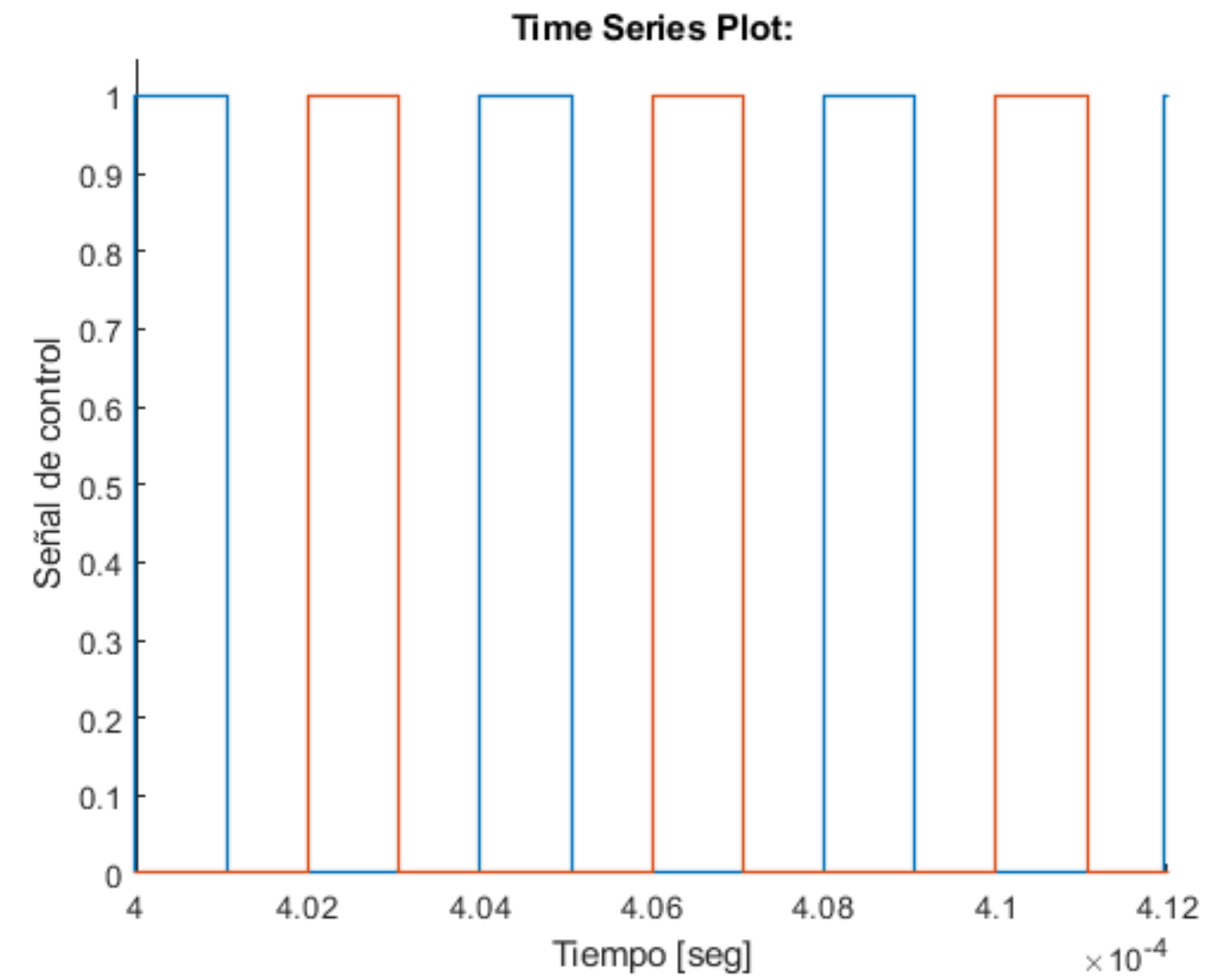
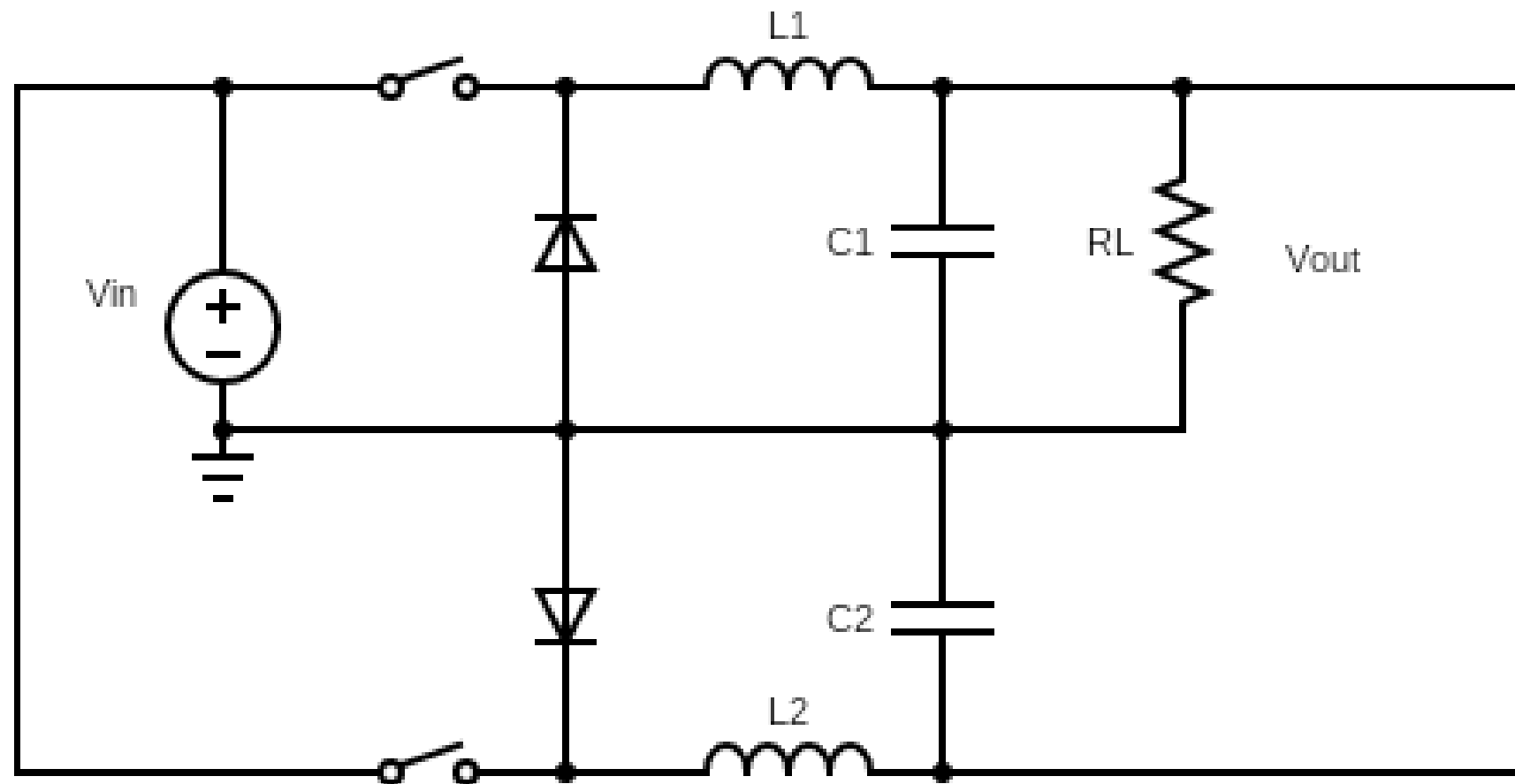
$$V_o = \frac{V_i (V_i - V_o) \delta^2 T_s}{2L I_o}$$



PROBLEMA 1



BUCK MULTIFASE



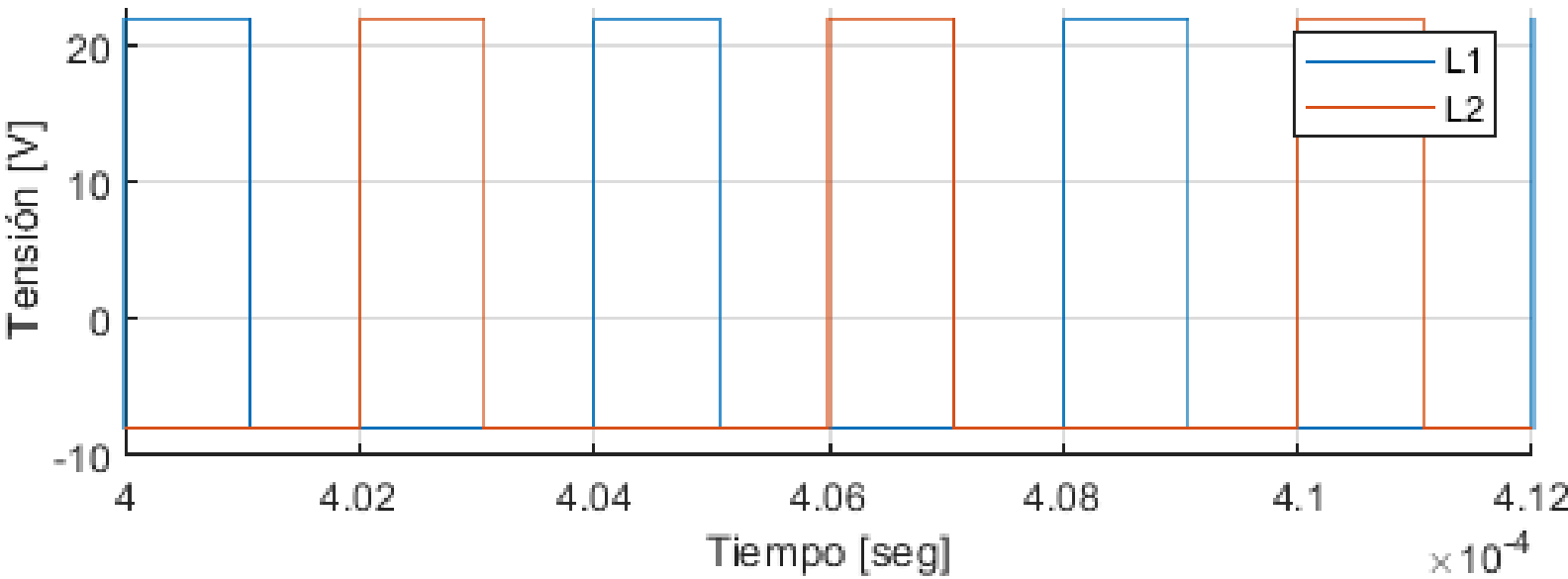
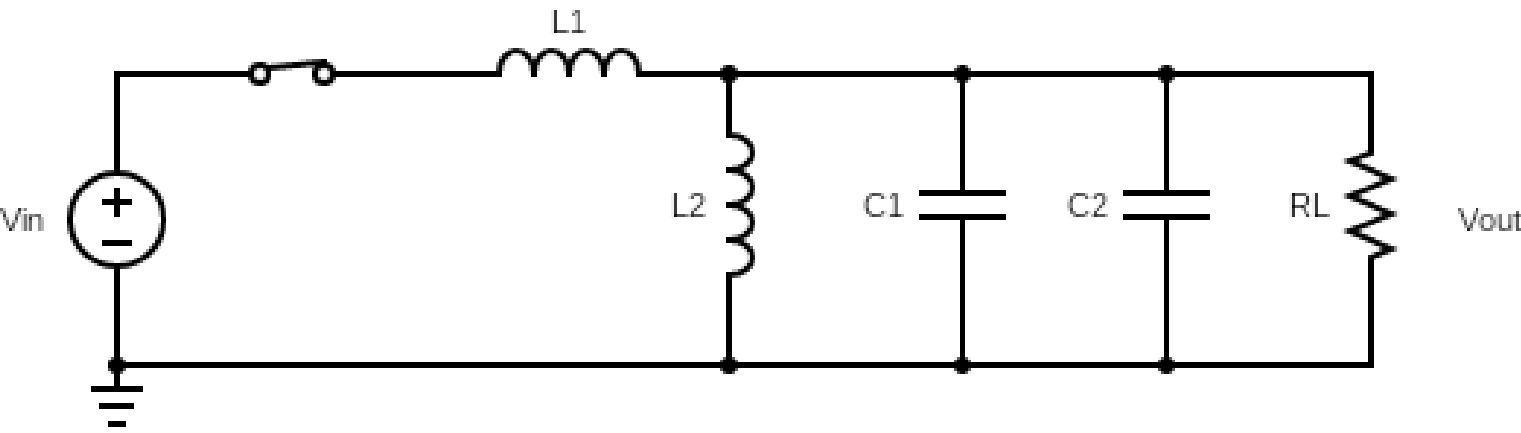
DUTY CICLE = 26.66%

PROBLEMA 1

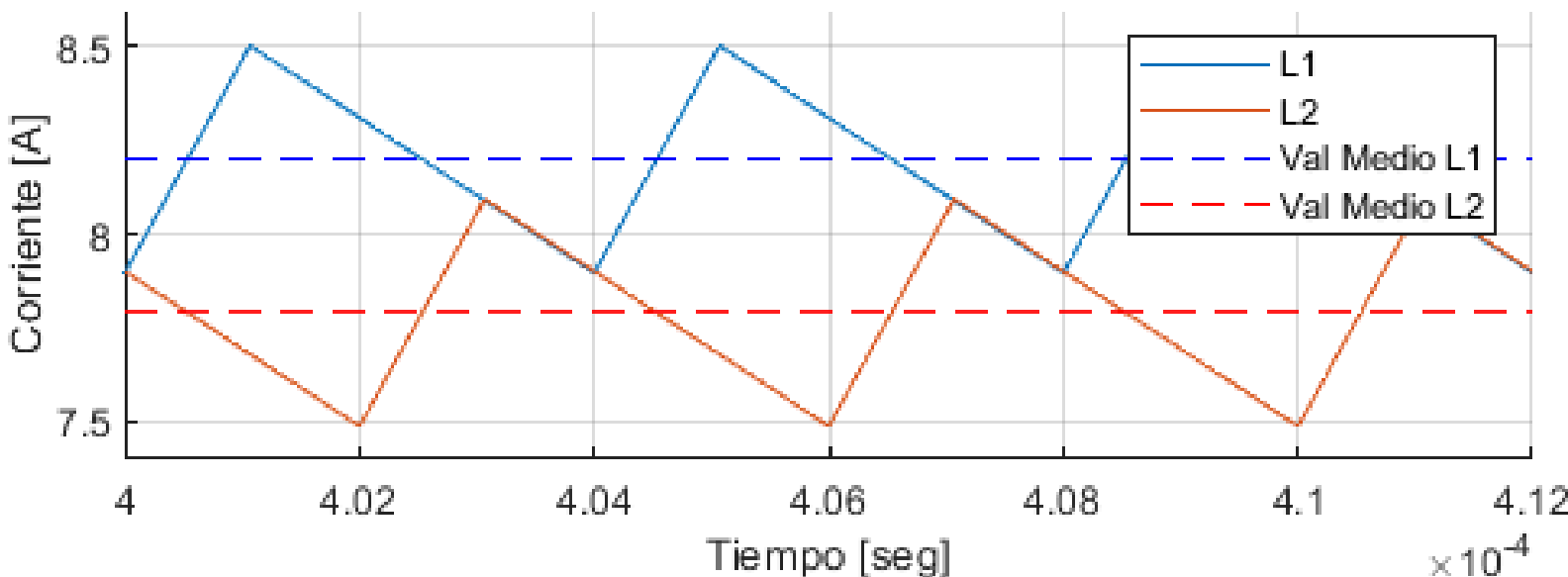
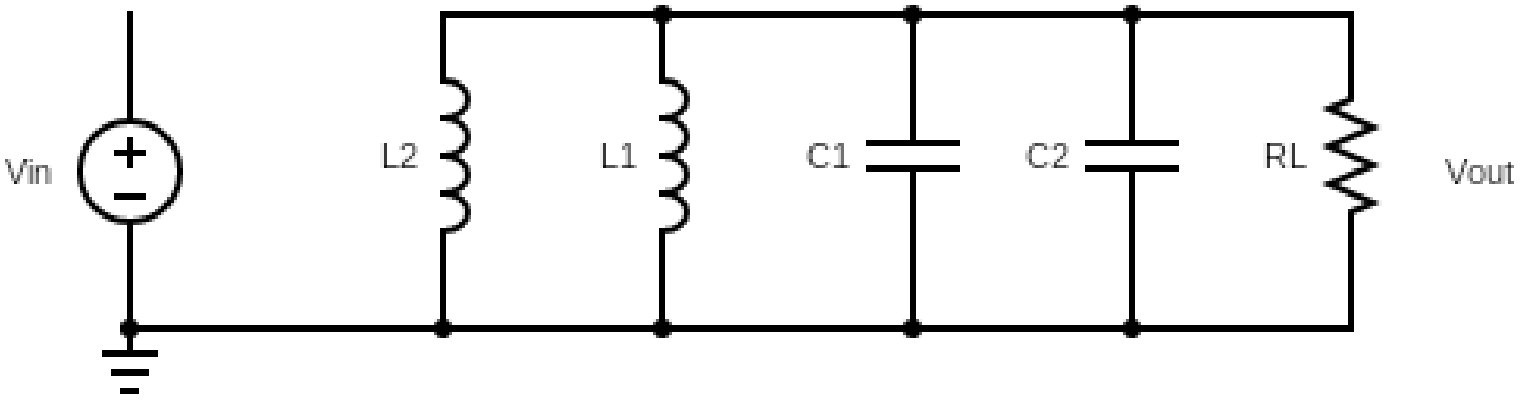


Tensión y Corriente en Inductores $\delta=26.66\%$

S1 CONDUCIENDO



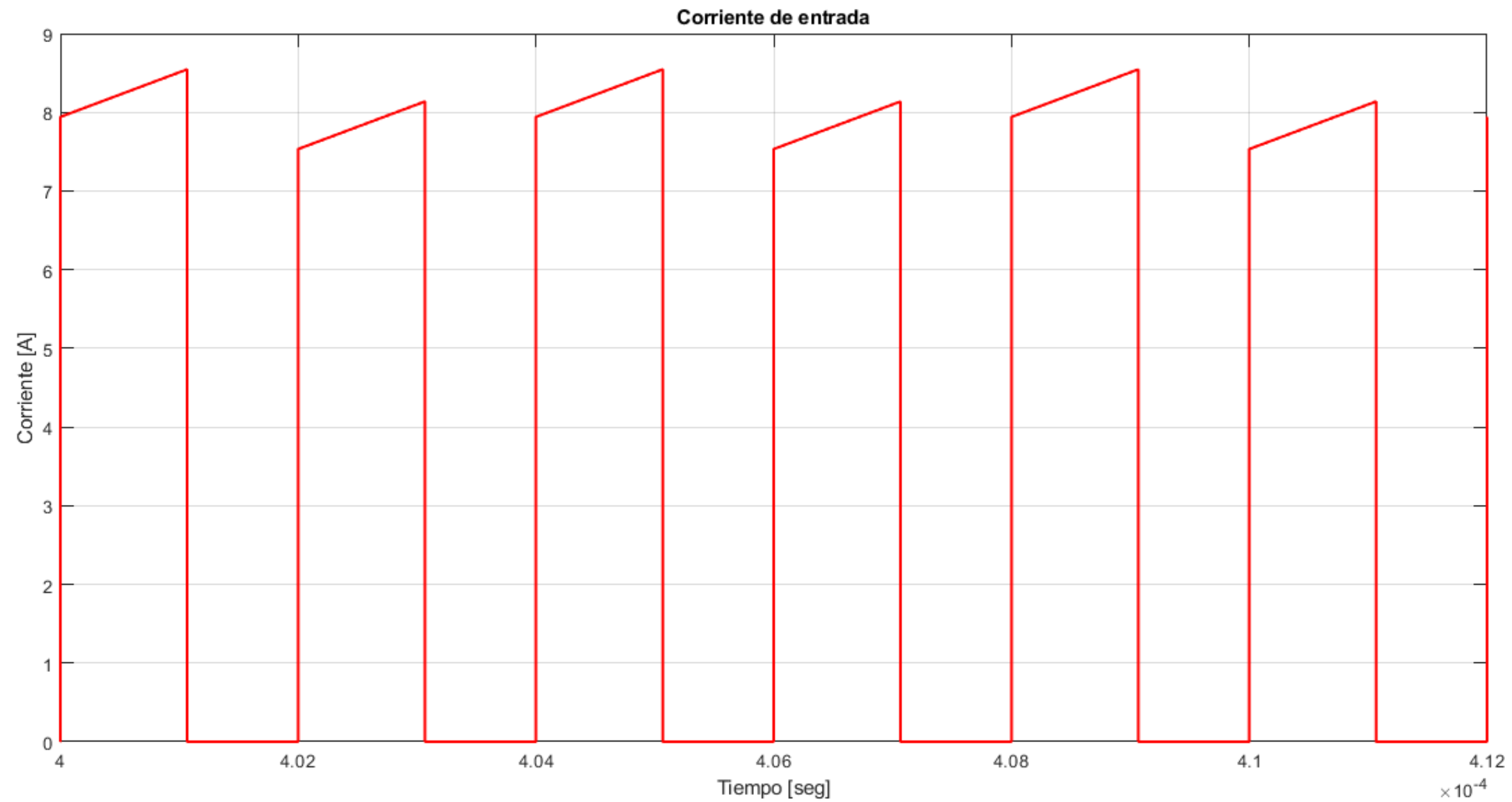
SWITCHS ABIERTOS



PROBLEMA 1



Corriente de entrada $\delta=26.66\%$



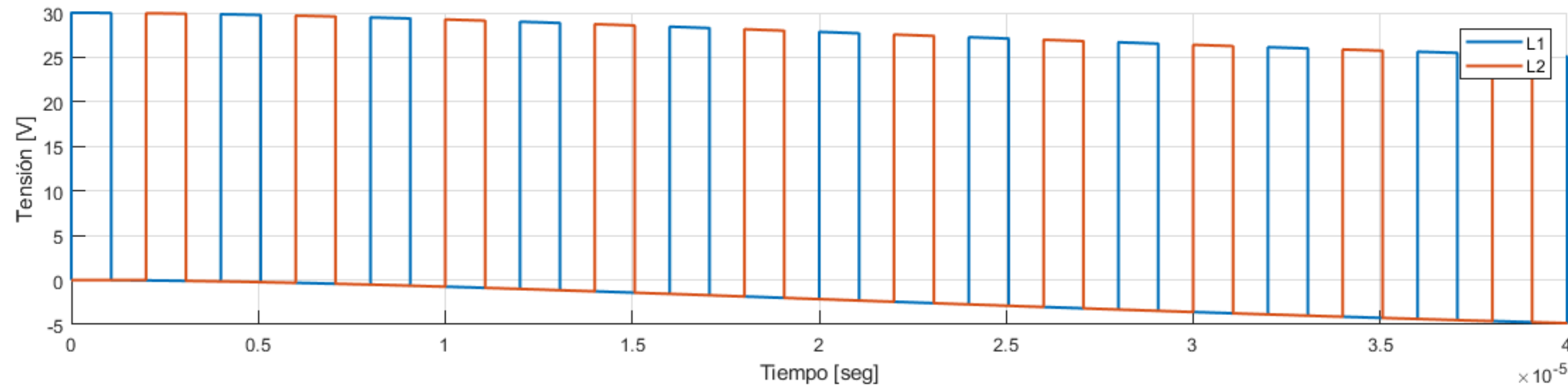
PROBLEMA 1



Respuesta Transitoria

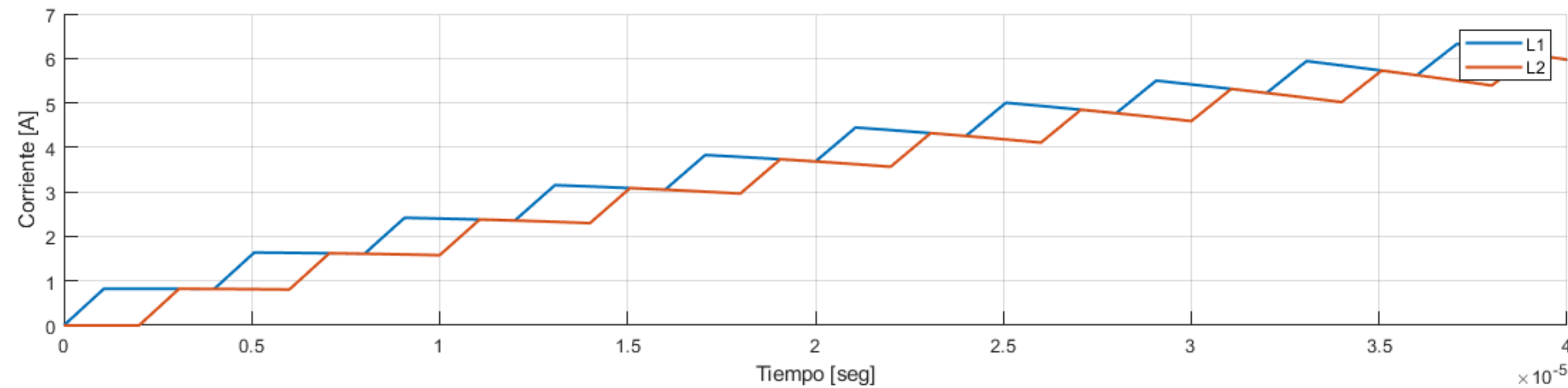
SWITCH CERRADO

$$\Delta I_L = \frac{(V_{in} - V_{out})}{L} \delta T_s$$



SWITCH ABIERTO

$$\Delta I_L = \frac{-V_0}{L} T_s (1 - \delta)$$

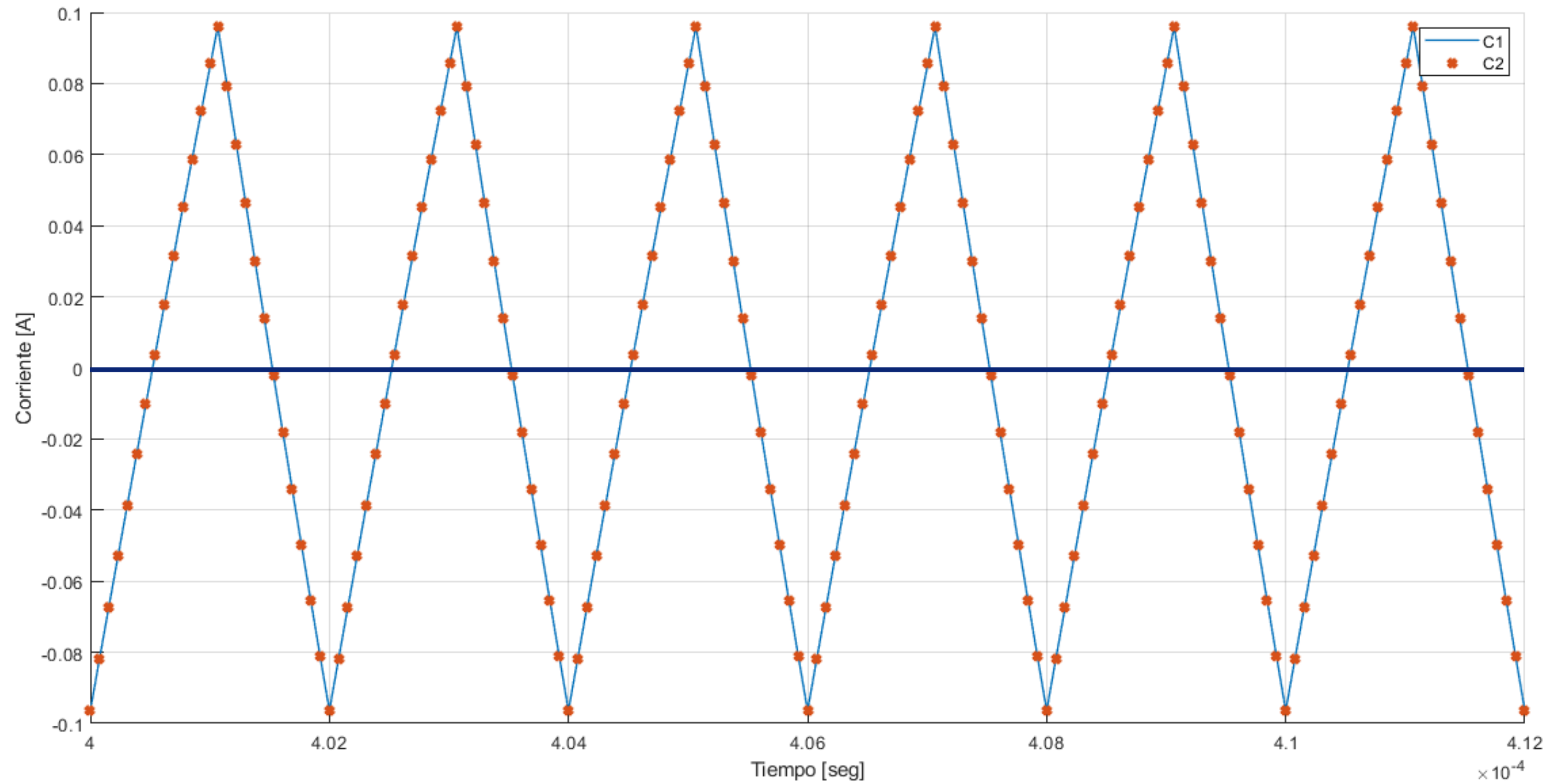


$$v_L = L \frac{di}{dt}$$

PROBLEMA 1



Corriente en capacitores



$$\bar{i}_C = 0$$

PROBLEMA 1

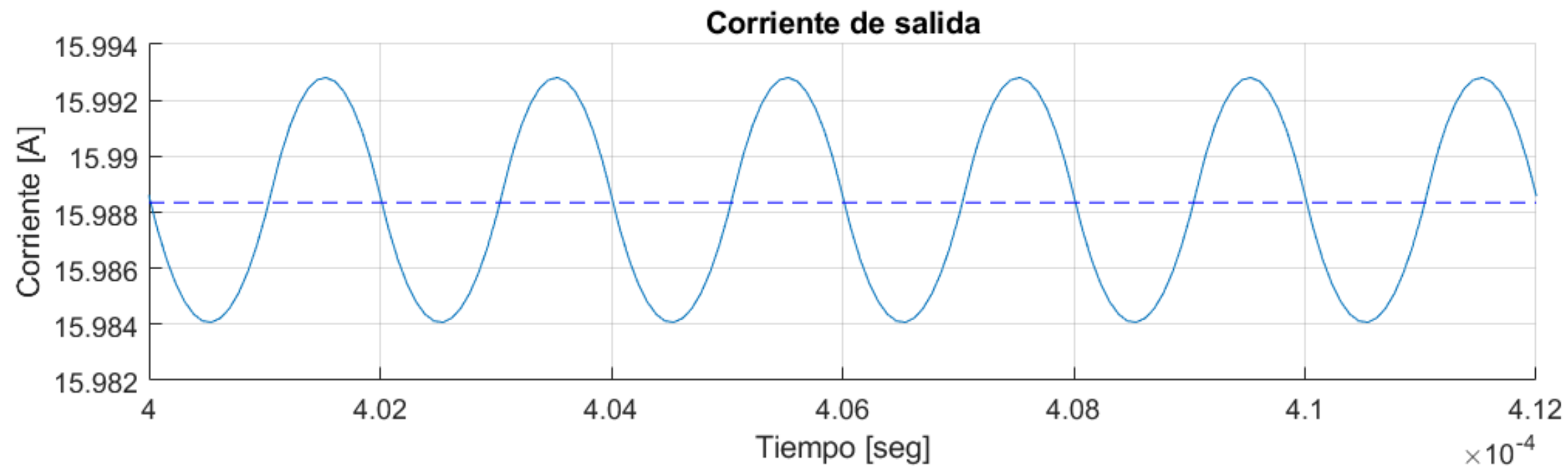


Tensión y Corriente de Salida



$$\Delta V_0 = 0,0044V$$

$$V_0 = \delta V_{in}$$

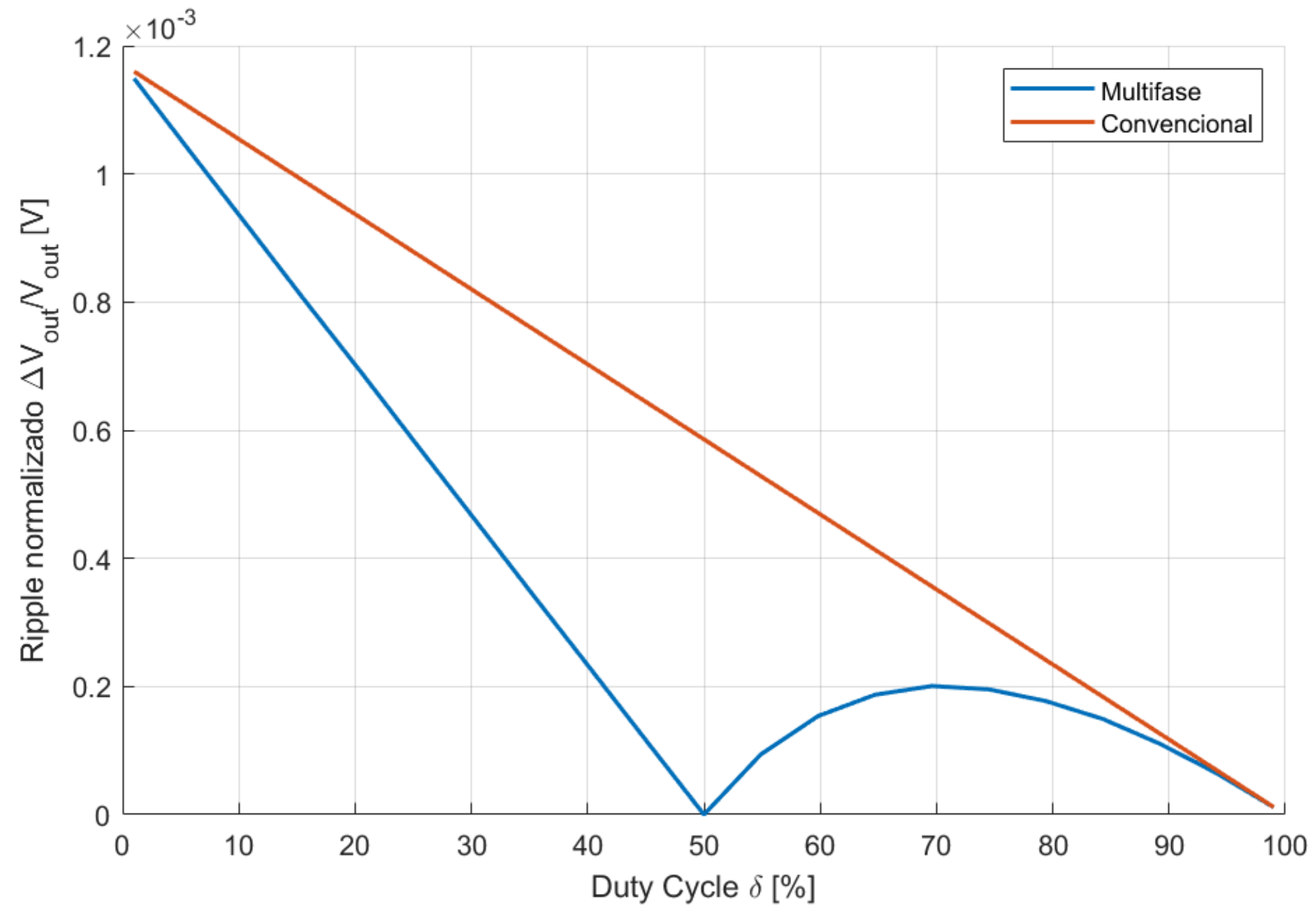


$$\Delta I_0 = 0,0087A$$

PROBLEMA 1



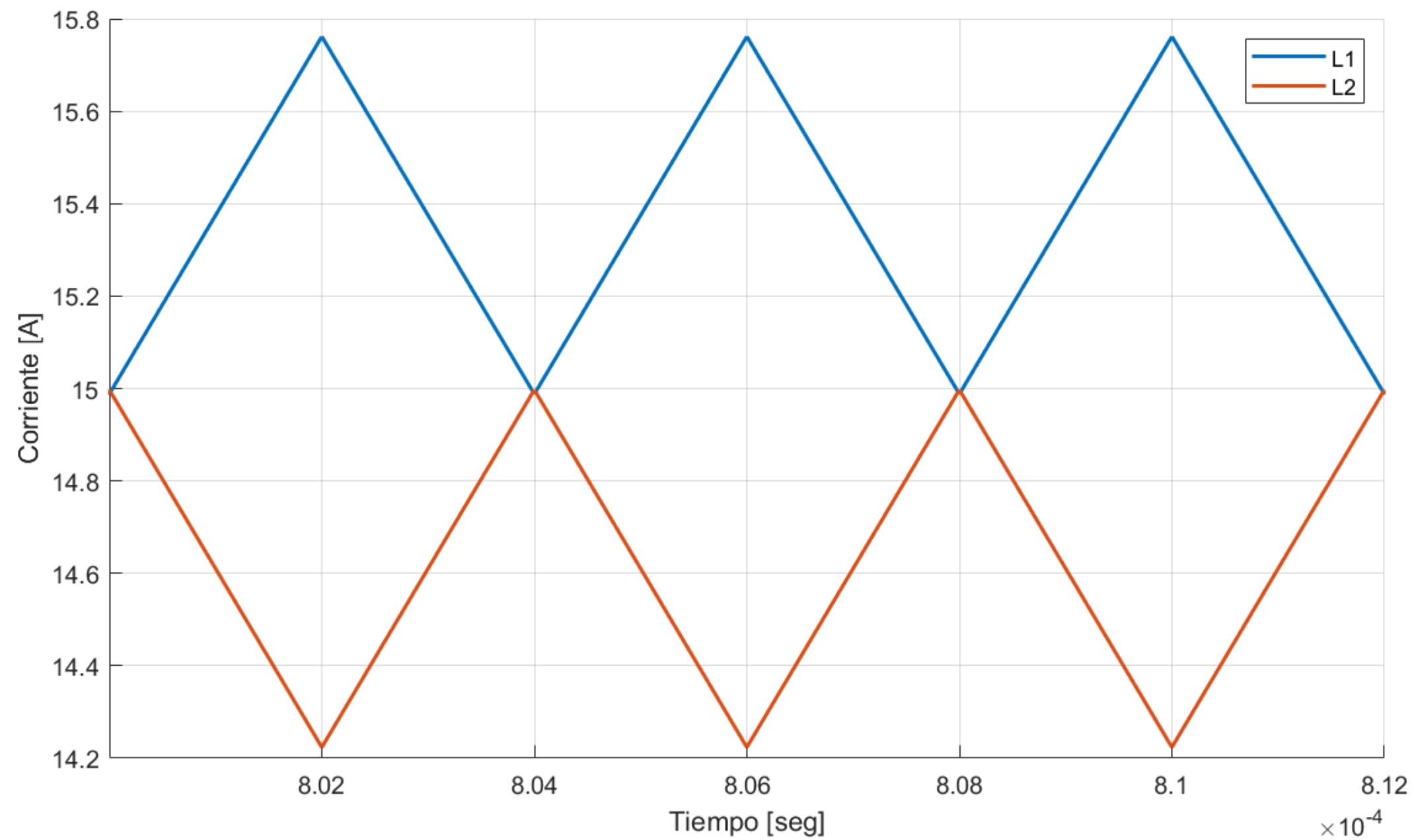
Ripple en función del Duty Cycle



PROBLEMA 1

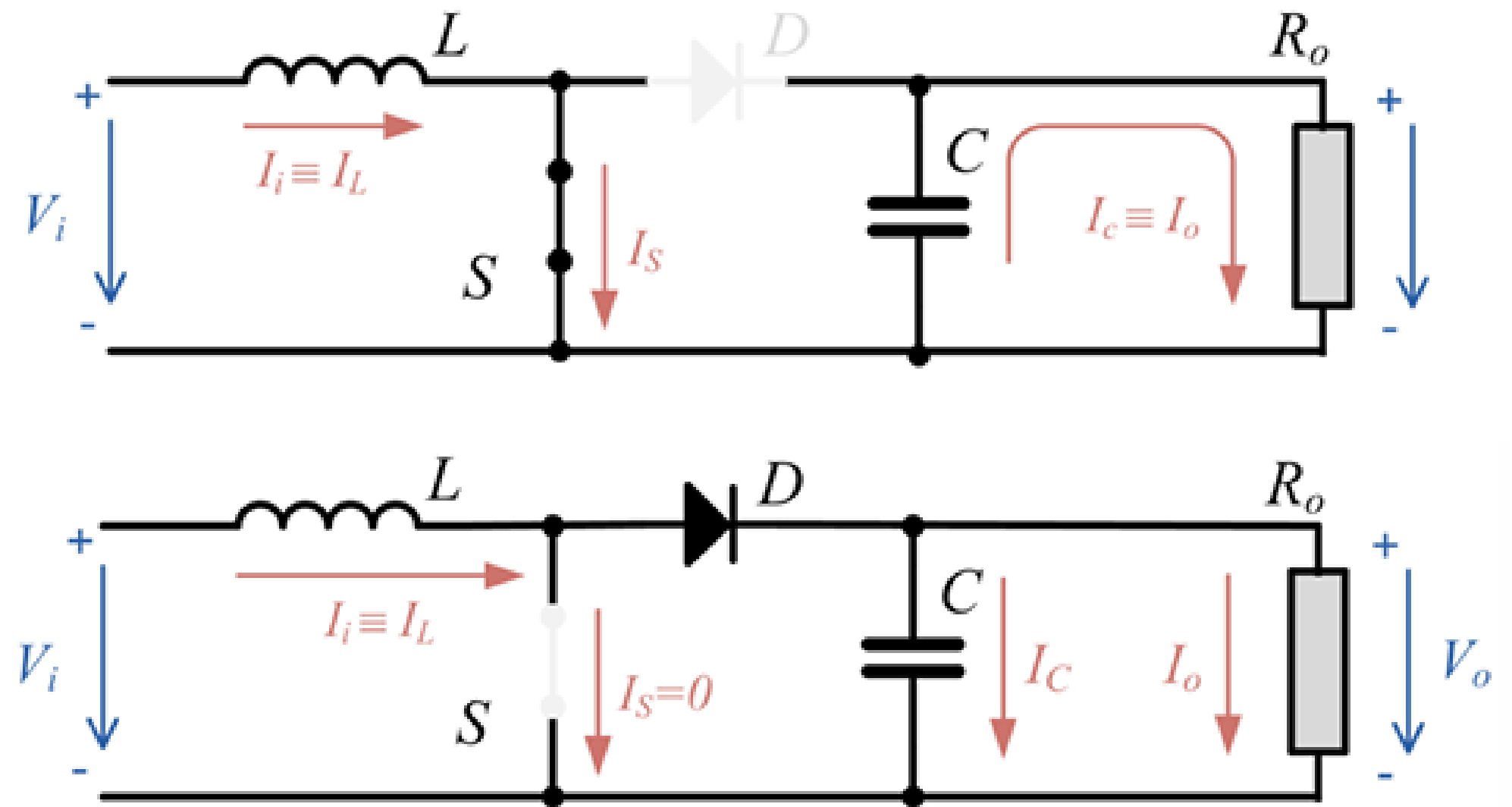
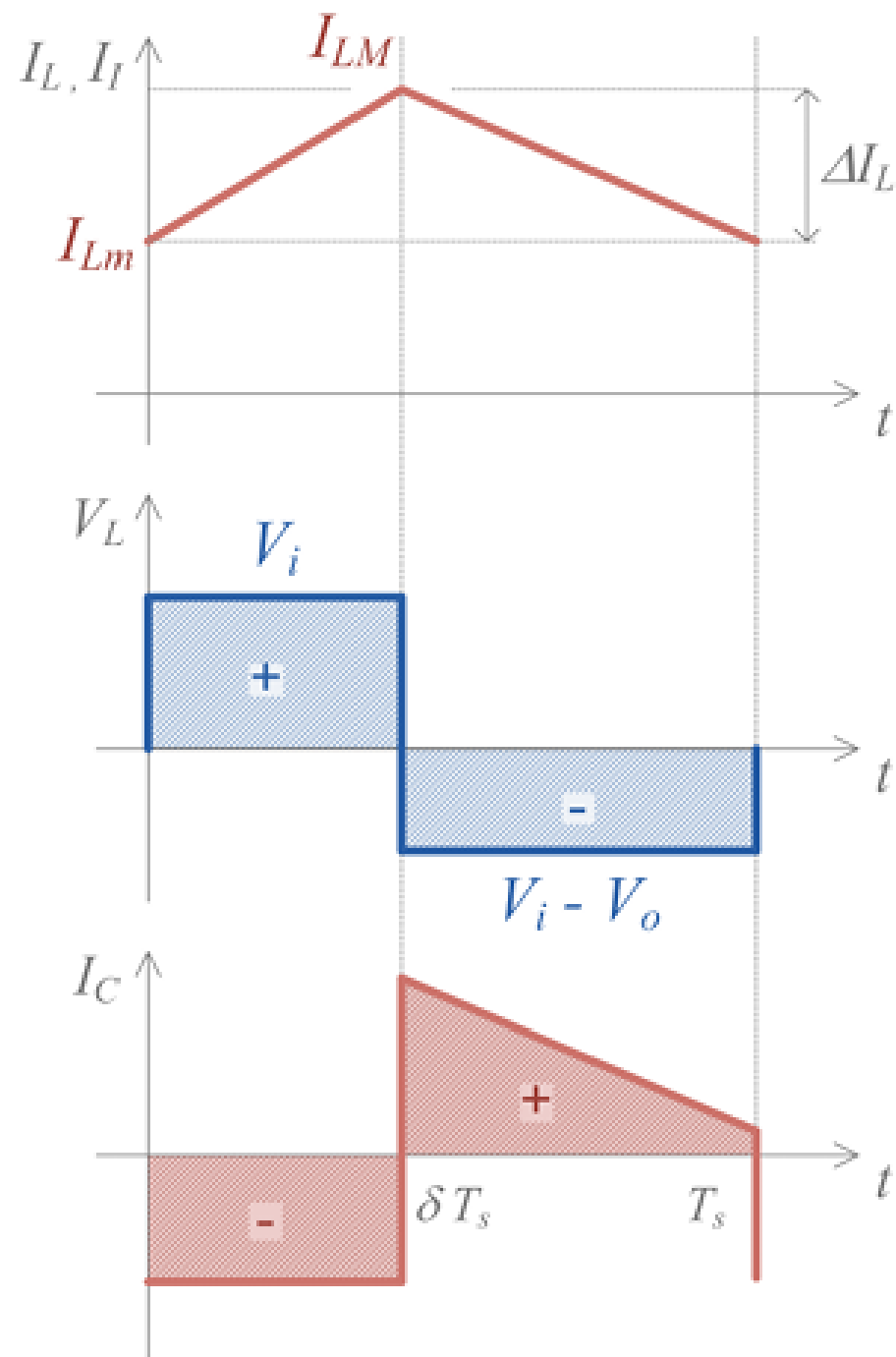


Tensión y Corriente en Inductores $\delta=50\%$



CONVERTIDOR BOOST

Conducción continua o ininterrumpida



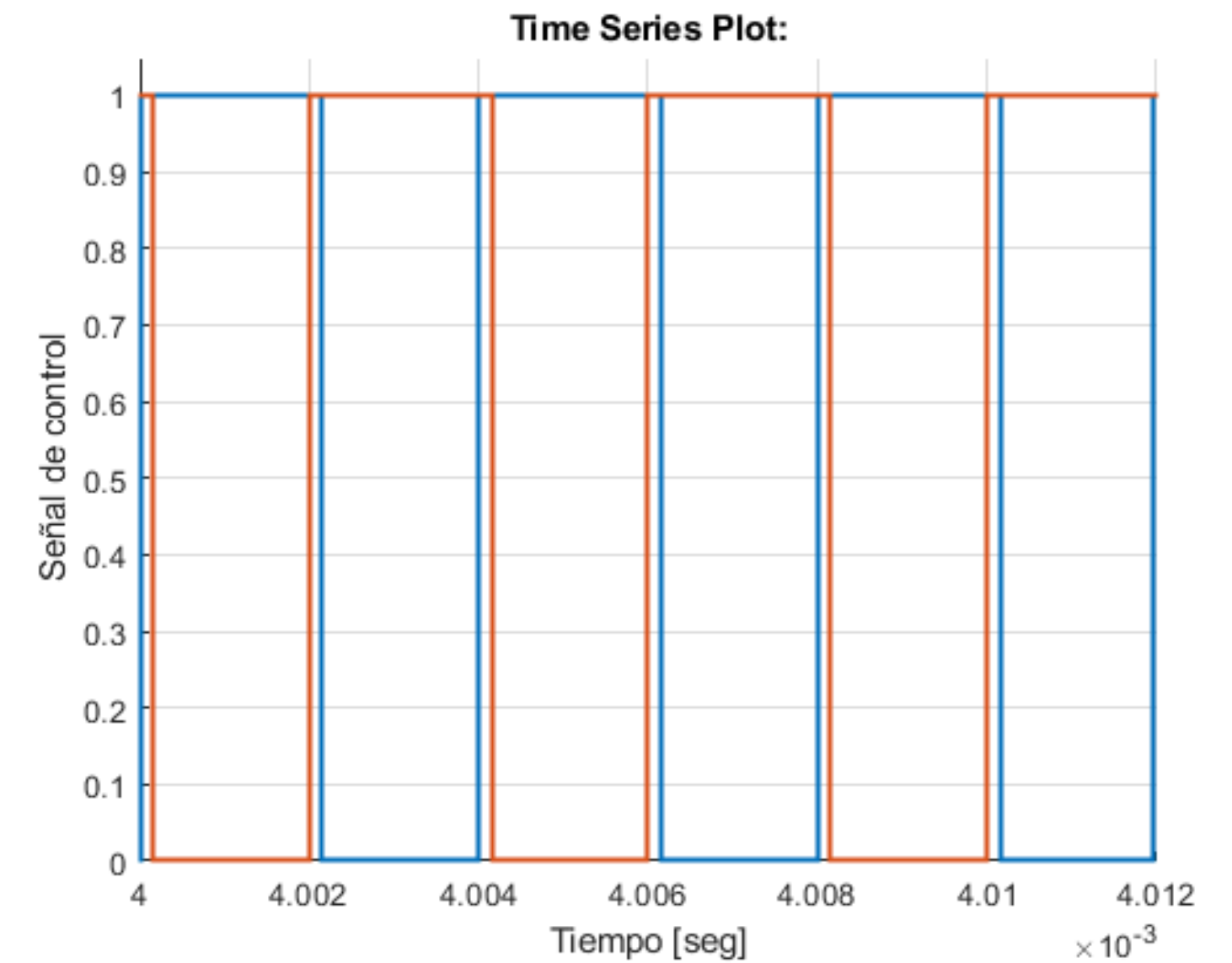
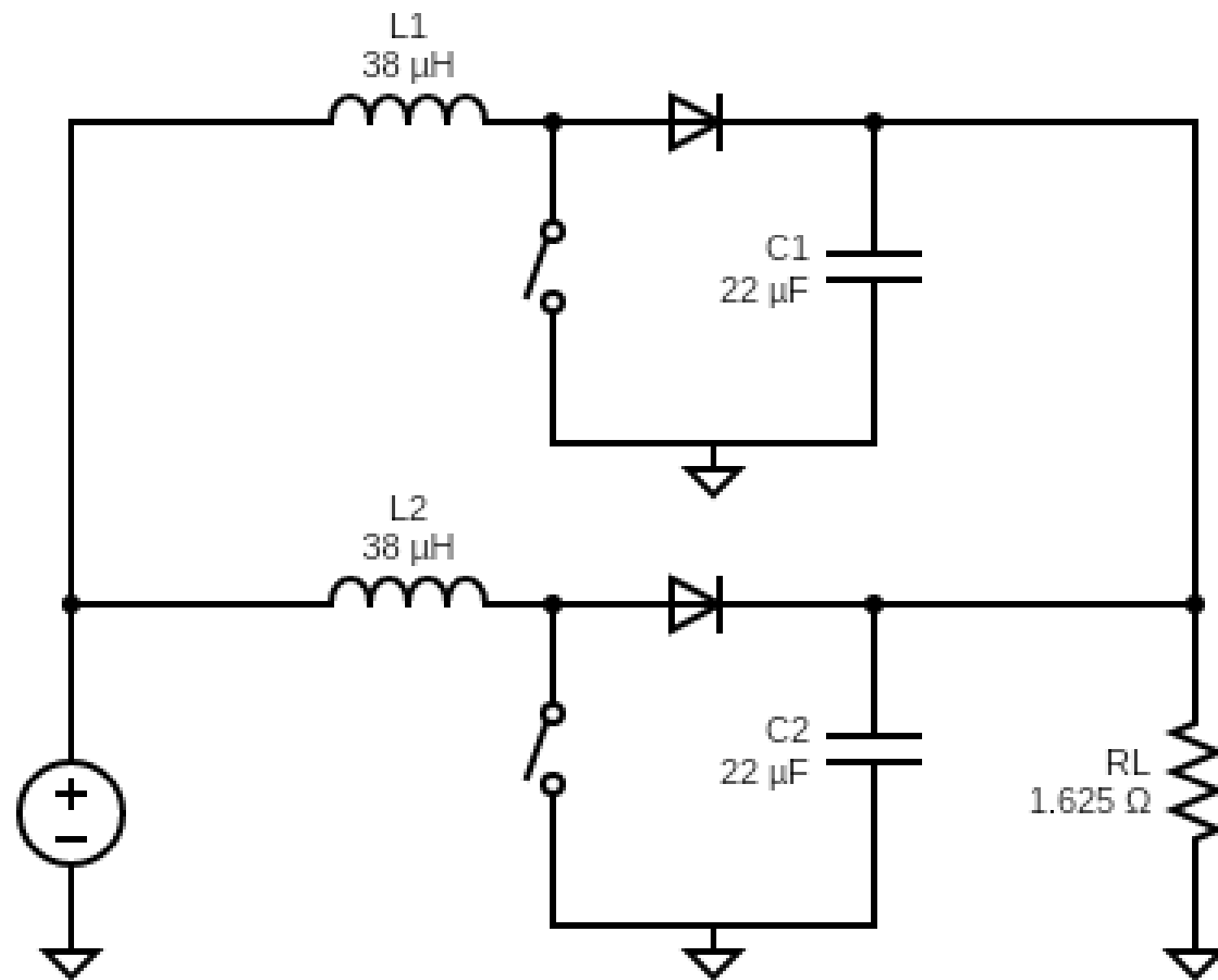
$$V_i \delta T_s = (V_o - V_i) (1 - \delta) T_s$$

$$V_o = \frac{1}{1 - \delta} V_i$$

PROBLEMA 2



BOOST MULTIFASE



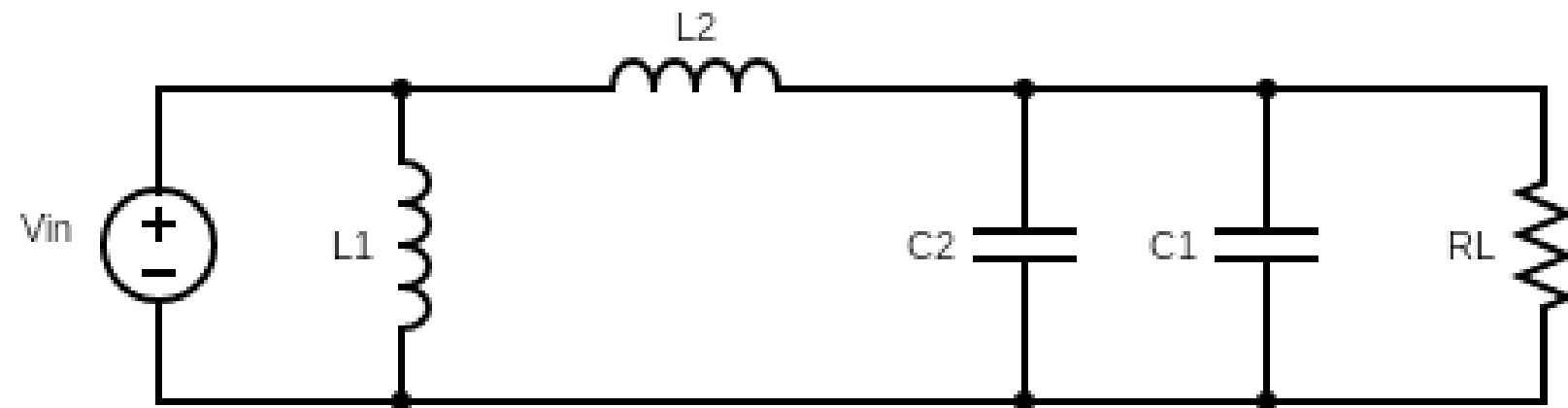
DUTY CICLE = 53.84%

PROBLEMA 2

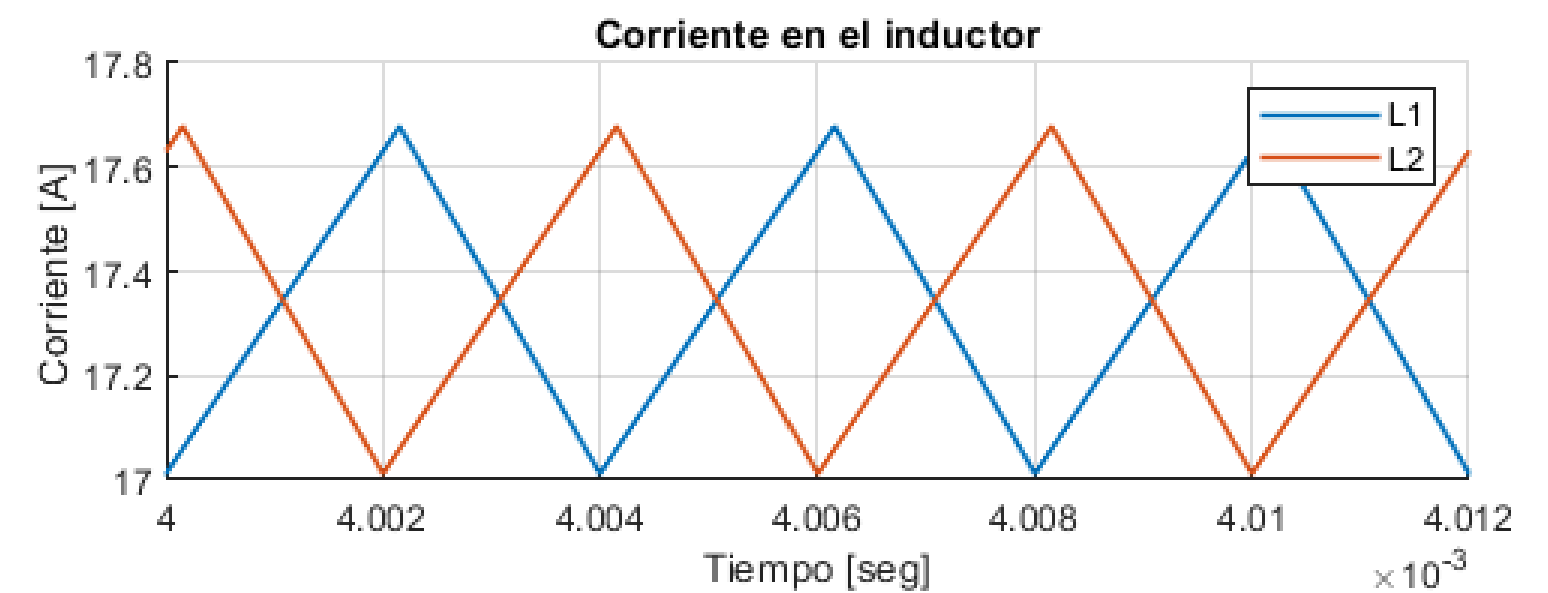
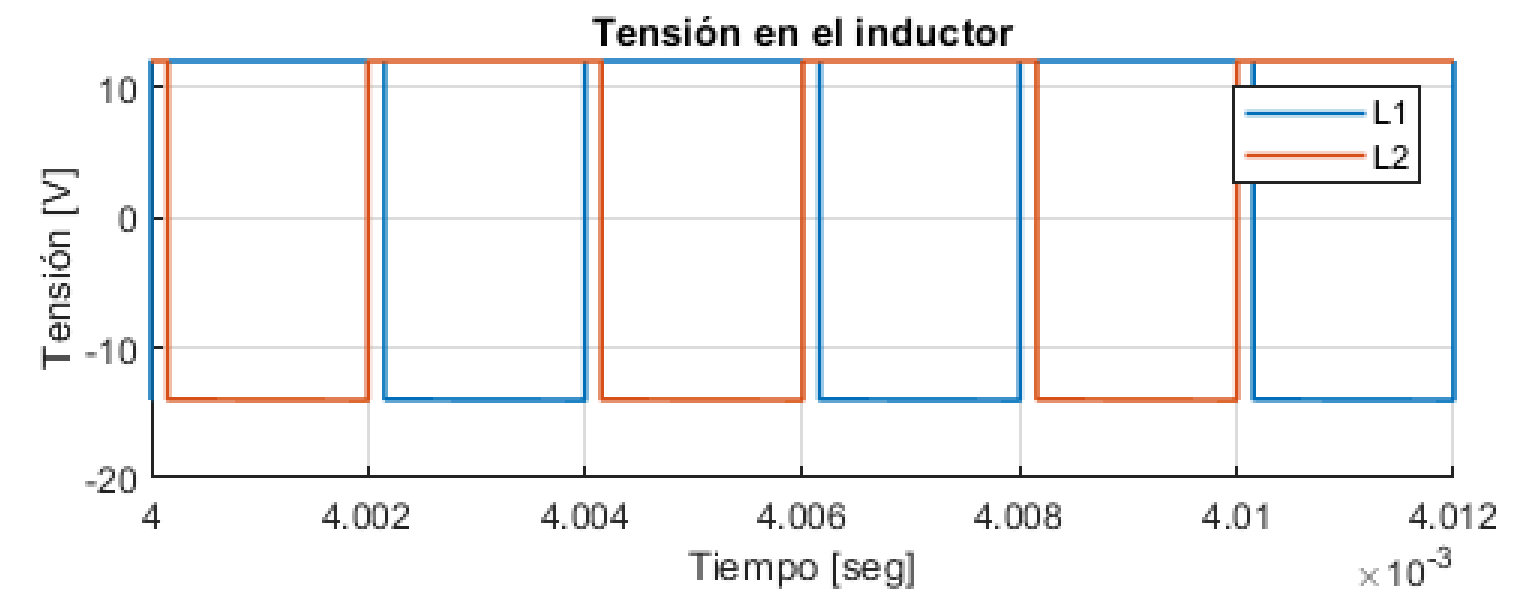
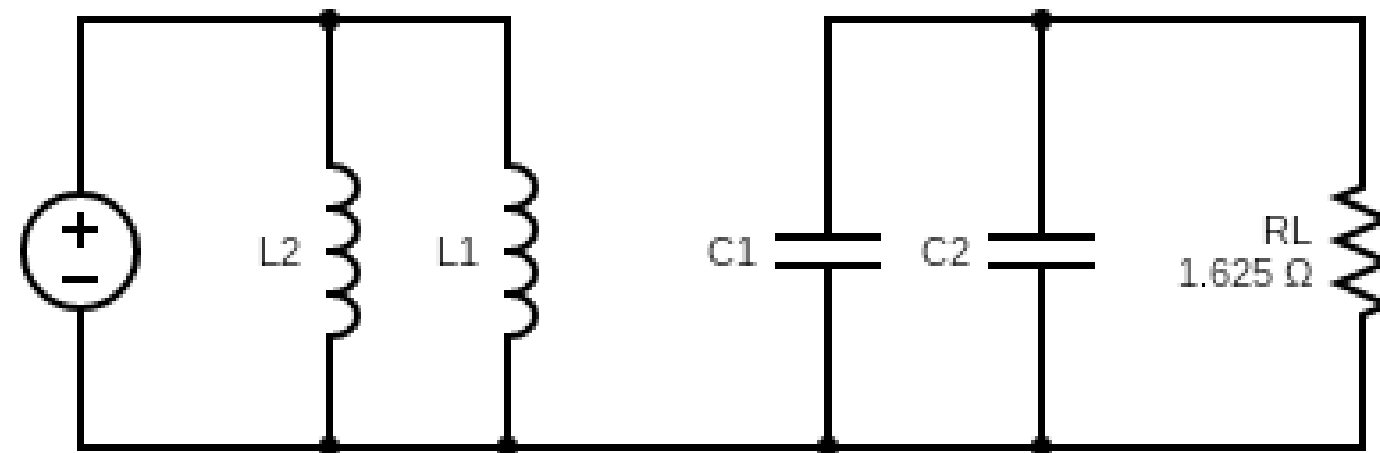


Tensión y Corriente en Inductores $\delta=53.84\%$

S1 CERRADO



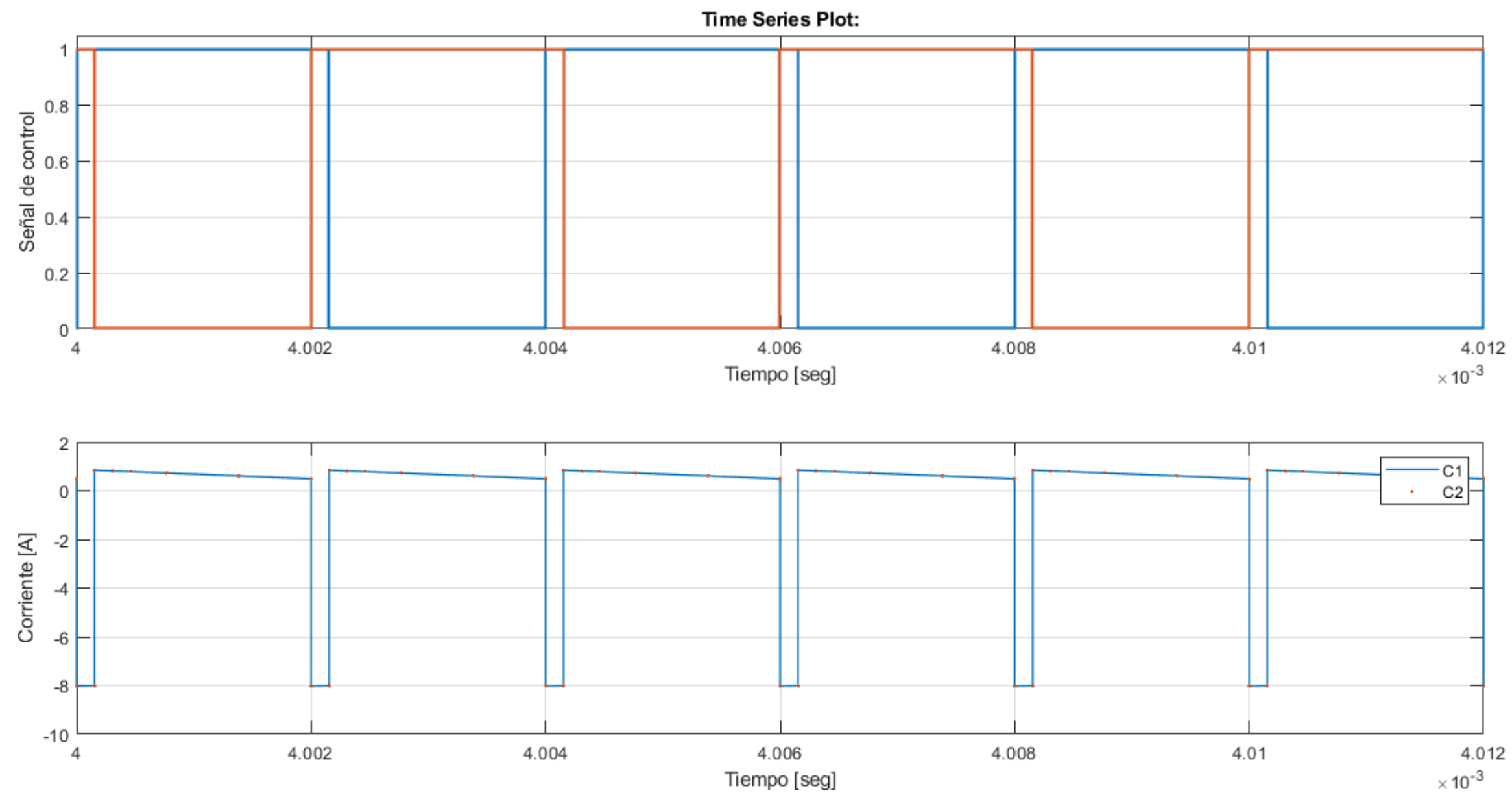
SWITCHS CERRADOS



PROBLEMA 2



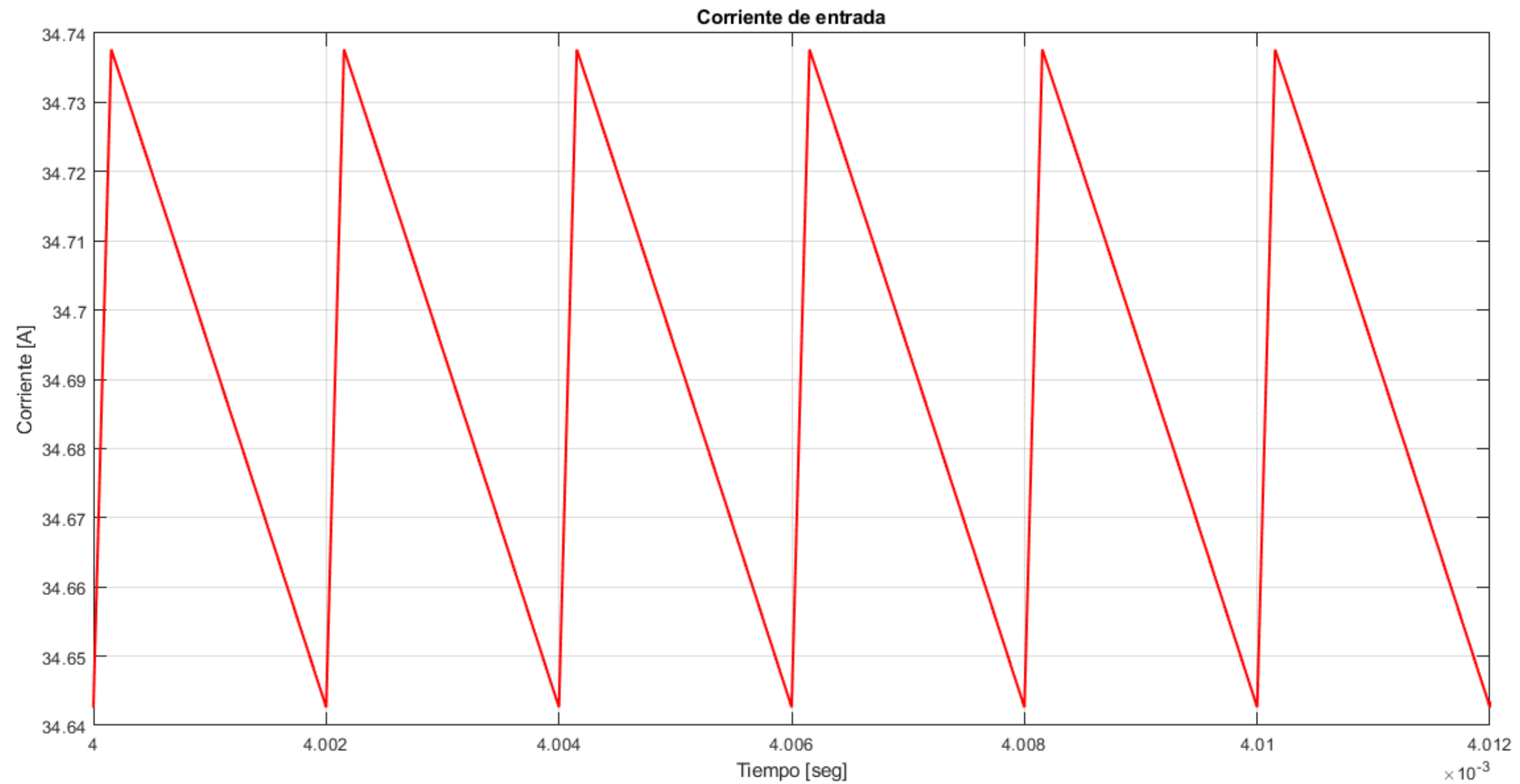
Corriente por los capacitores



PROBLEMA 2



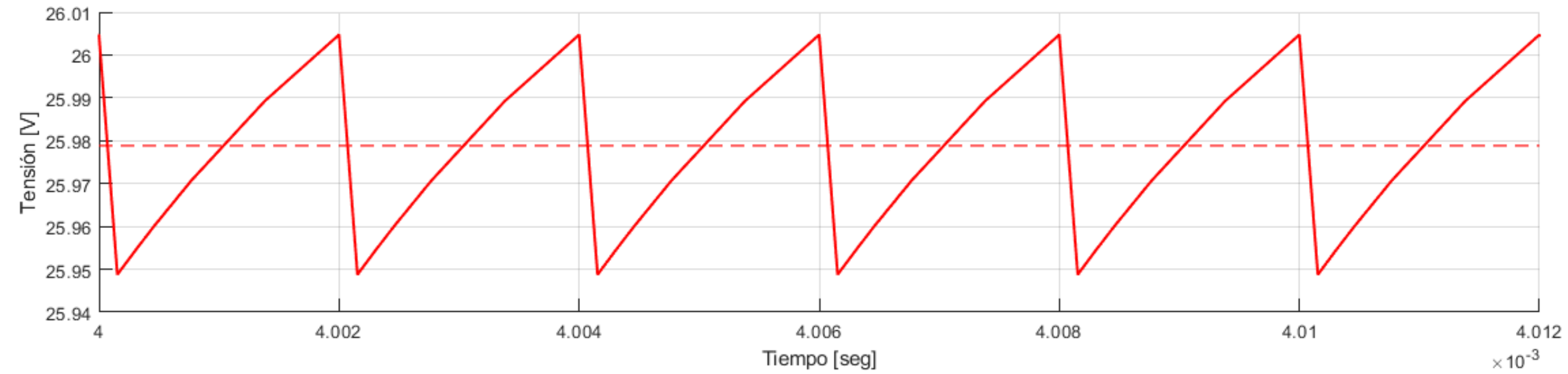
Corriente de entrada $\delta=53.84\%$



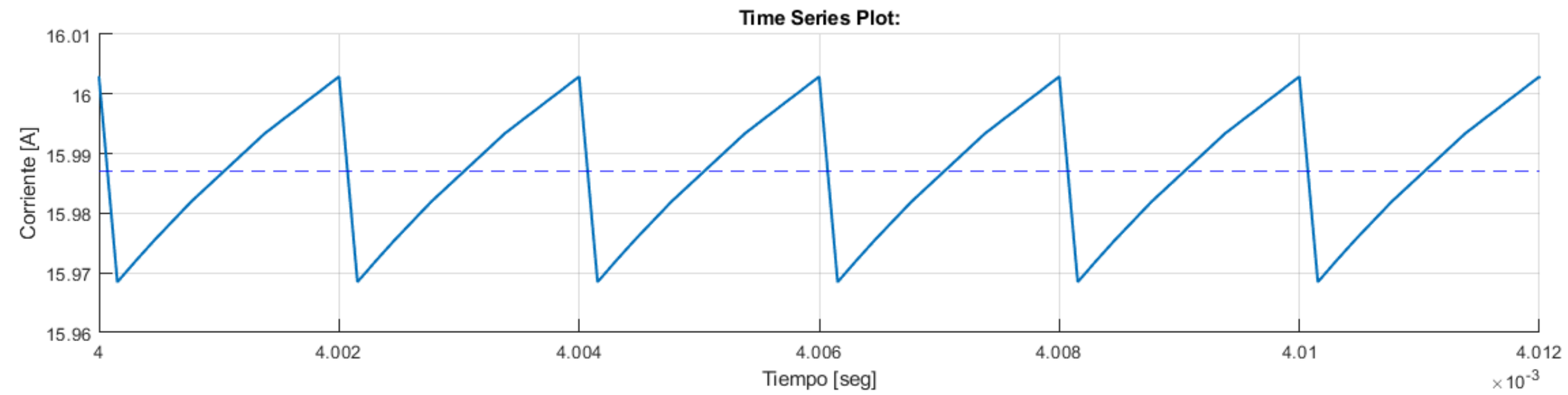
PROBLEMA 2



Tensión y corriente de salida



$$\Delta V_0 = 0,0560 V$$

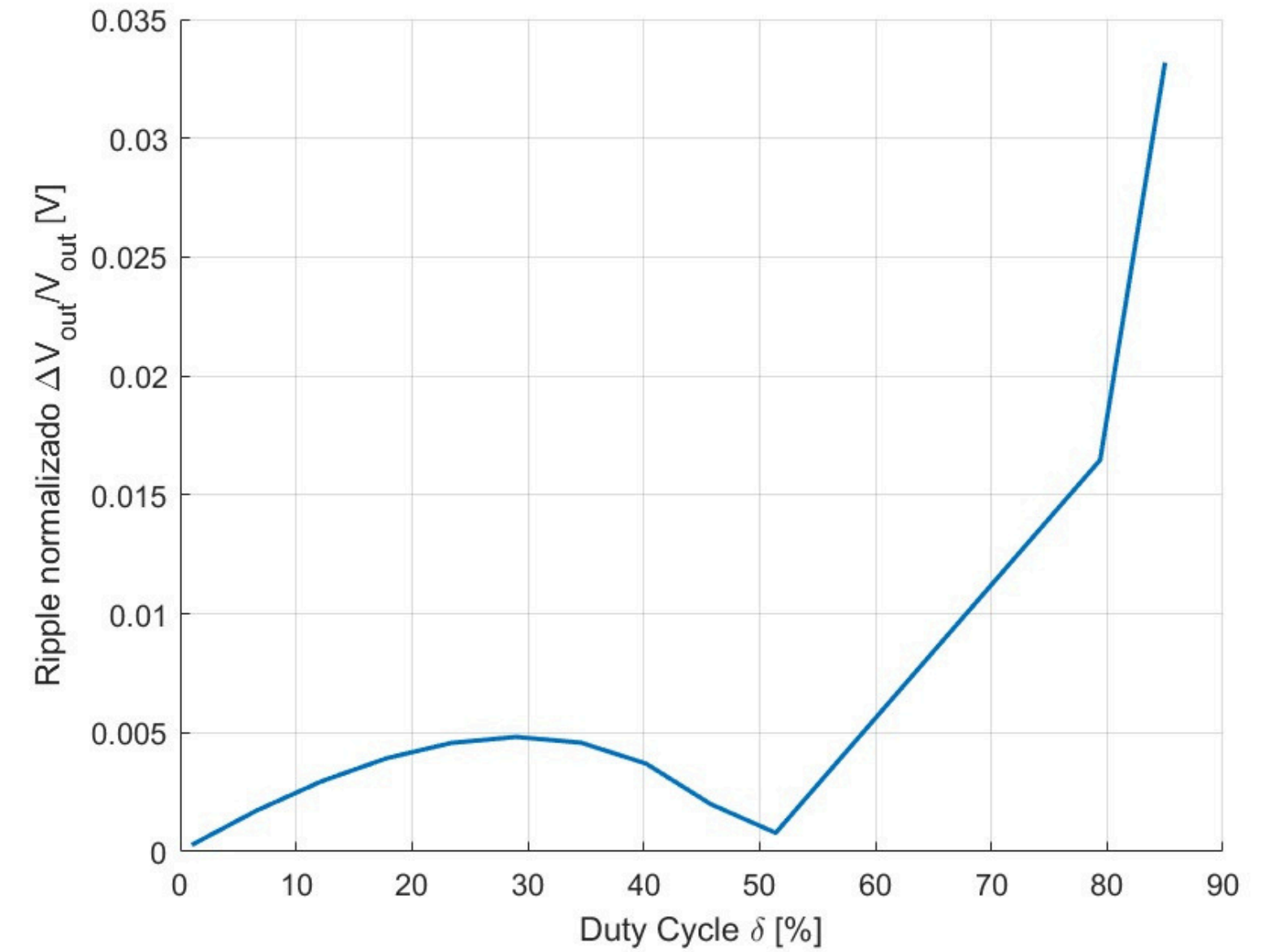
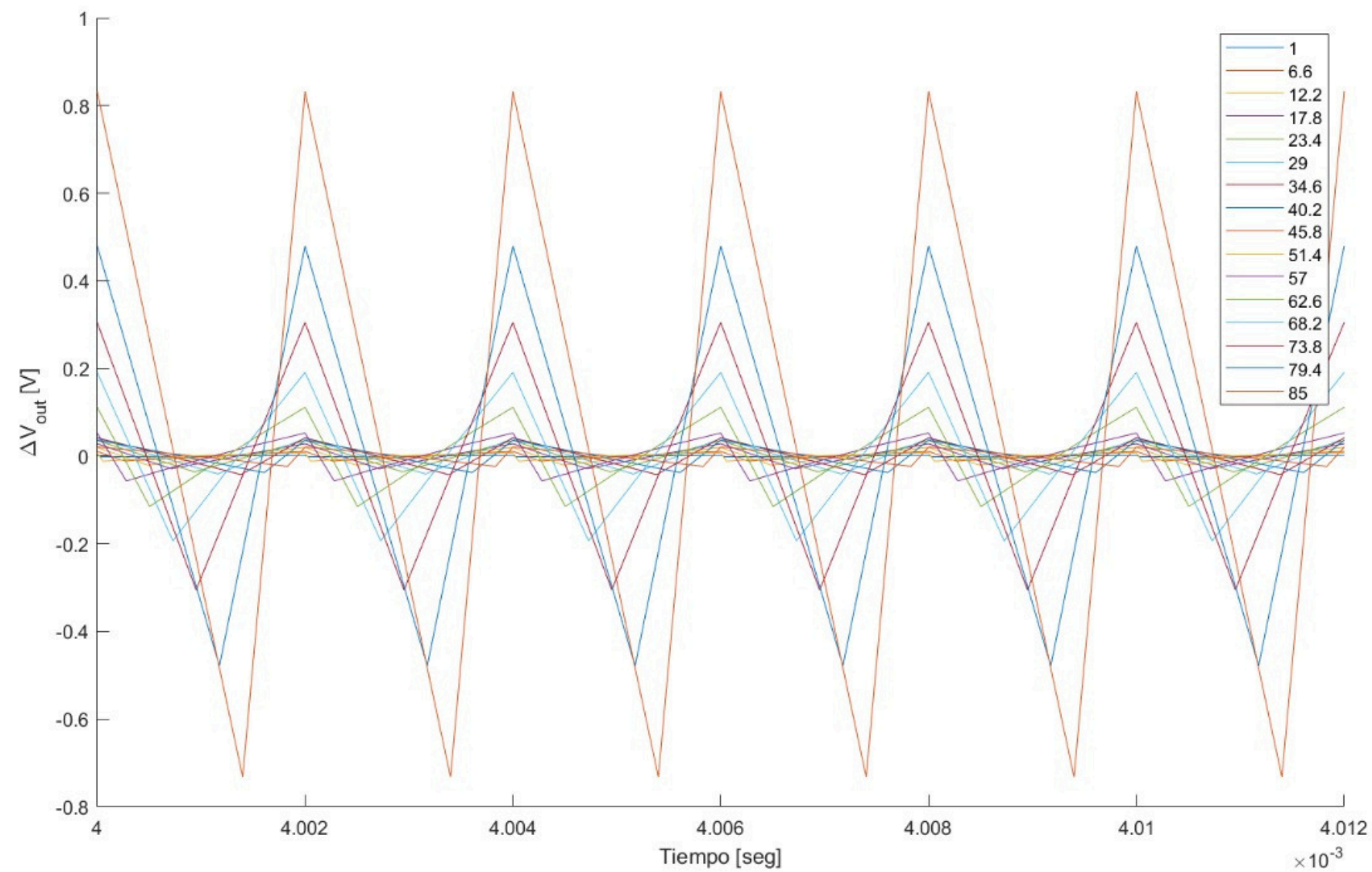


$$\Delta I_0 = 0,0345 A$$

PROBLEMA 2



Ripple de salida en función de δ



GRACIAS