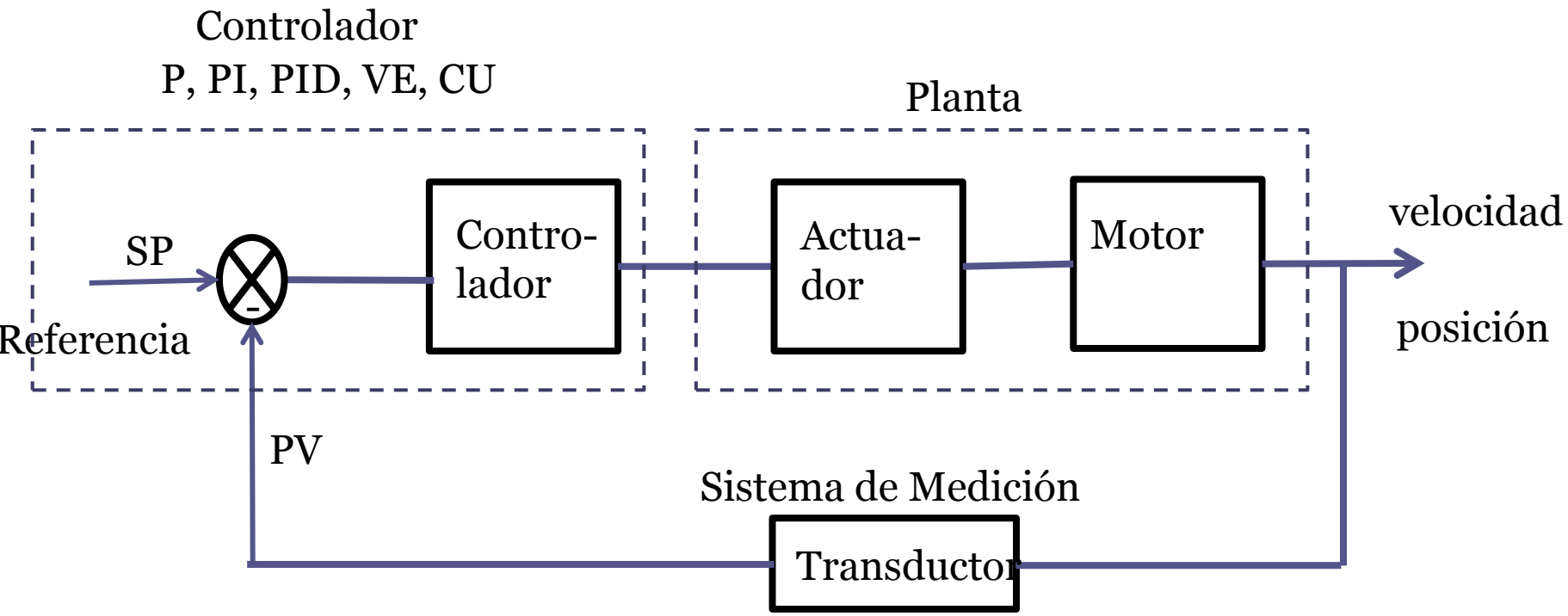
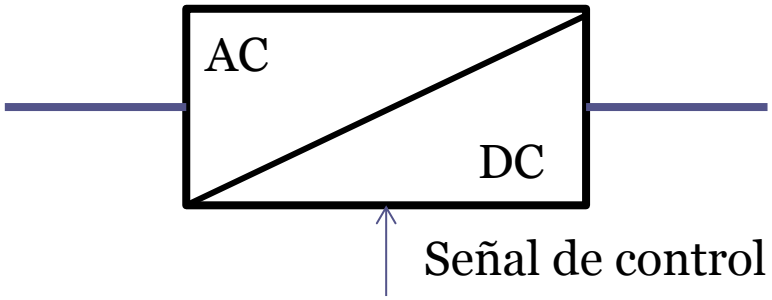
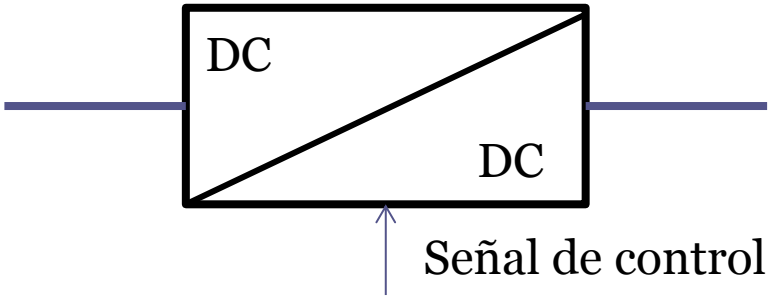

Controlador
P, PI, PID, VE, CU
Planta
SP
Referencia
Contro-
lador
Actua-
dor
Motor
velocidad
posición
PV
Sistema de Medición
Transductor

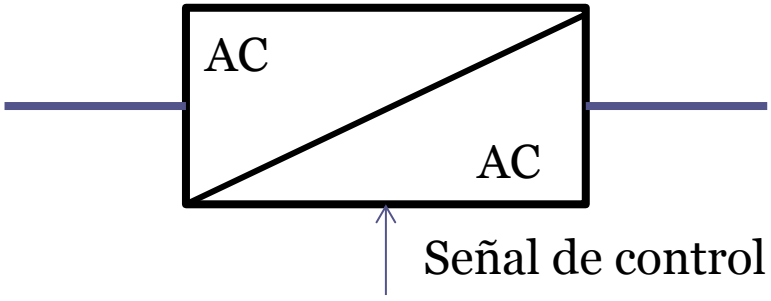
ELECTRONICA DE POTENCIA- CONVERTIDORES



RECTIFICADORES

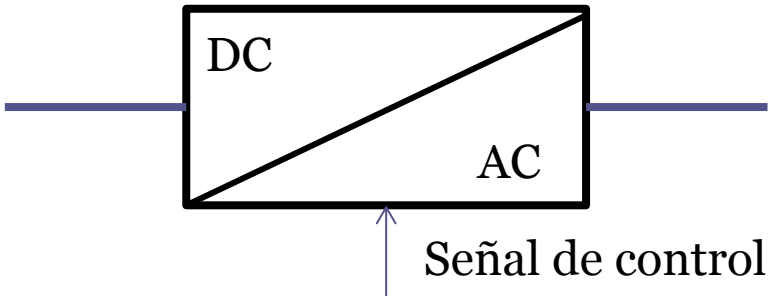


REGULADORES CONMUTADOS

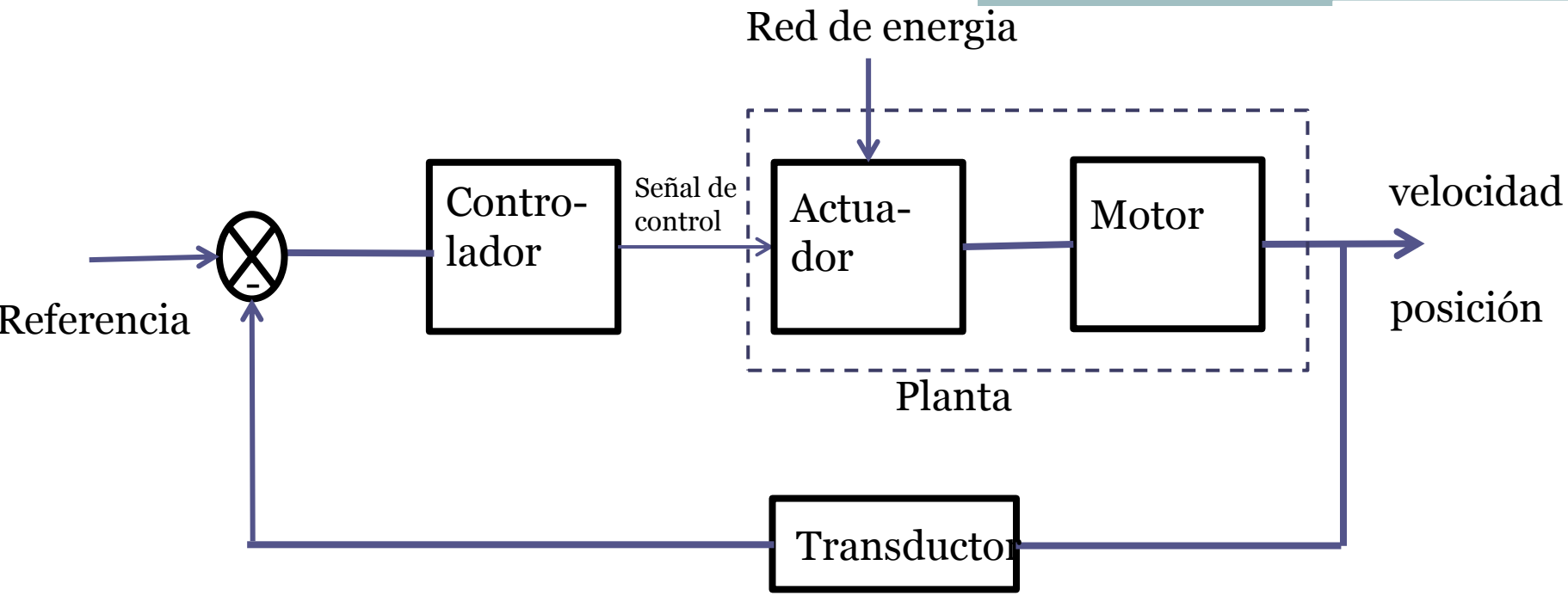


CONTROL DE POTENCIA DE ALTERNA

ELECTRONICA DE POTENCIA- CONVERTIDORES



ONDULADORES


Red de energia
Contro-
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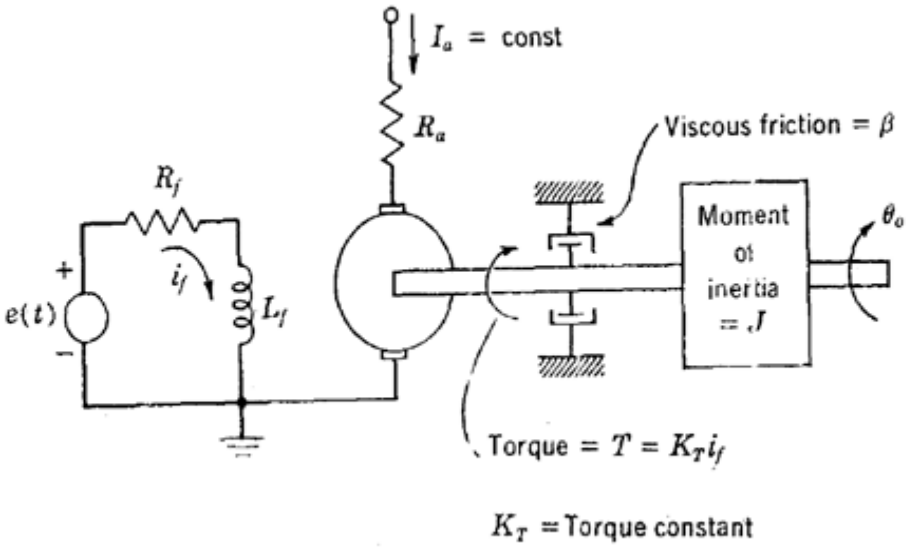
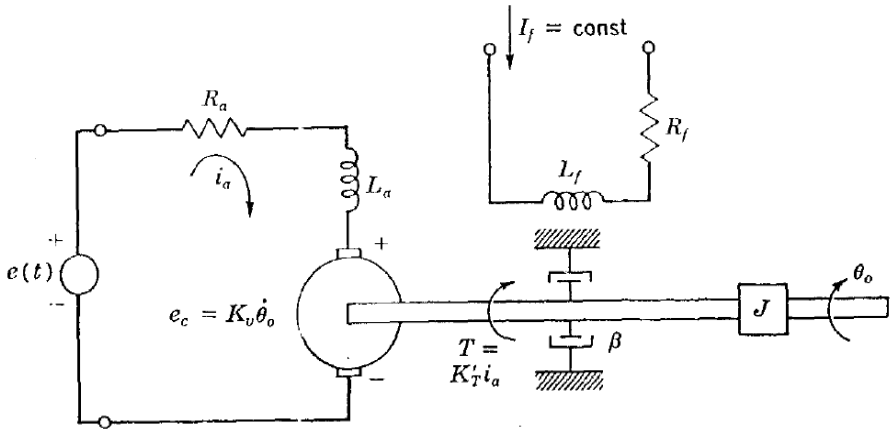
Señal de
control
Actua-
dor
Motor
velocidad
posición
Referencia
Planta
Transductor



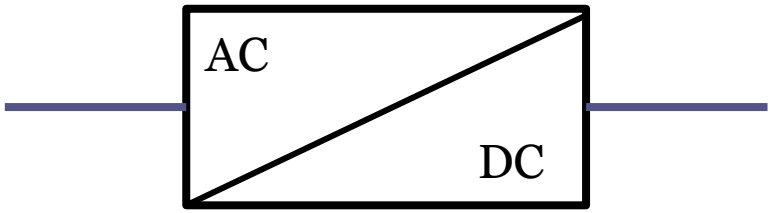
Motor de CC controlado por Campo

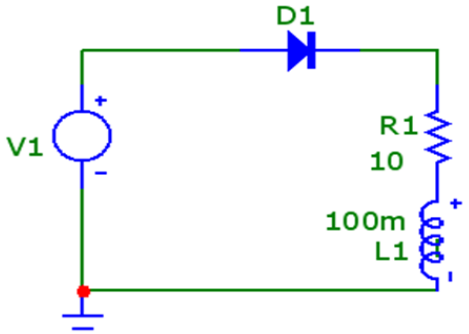
Motor de CC controlado por Armadura

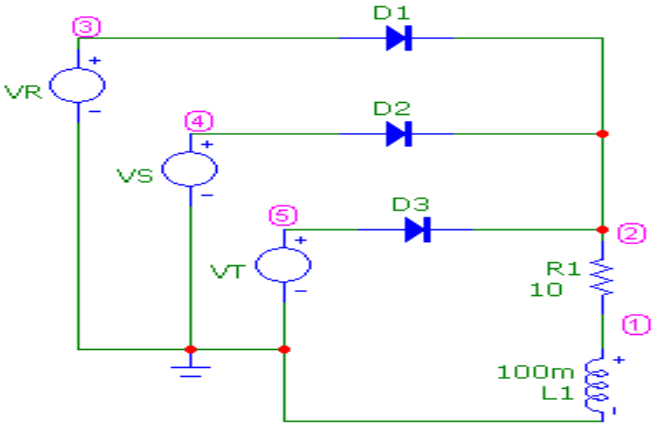


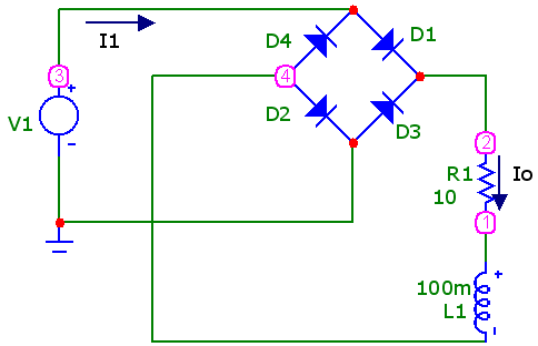
ELECTRONICA DE POTENCIA- CONVERTIDORES

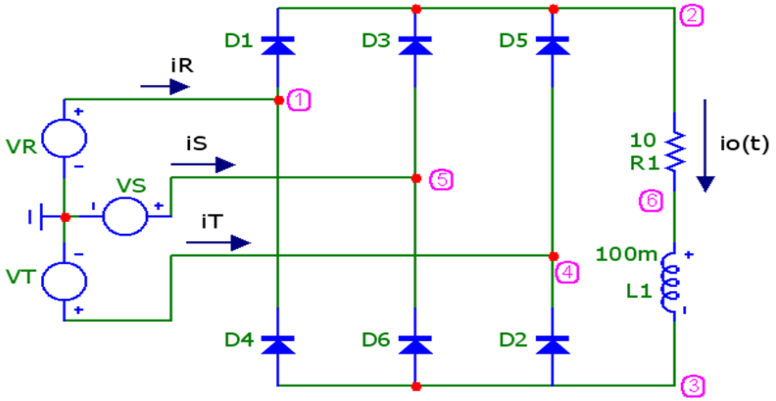
RECTIFICADORES





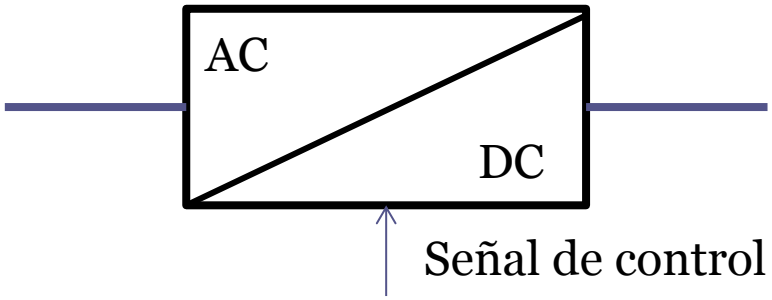


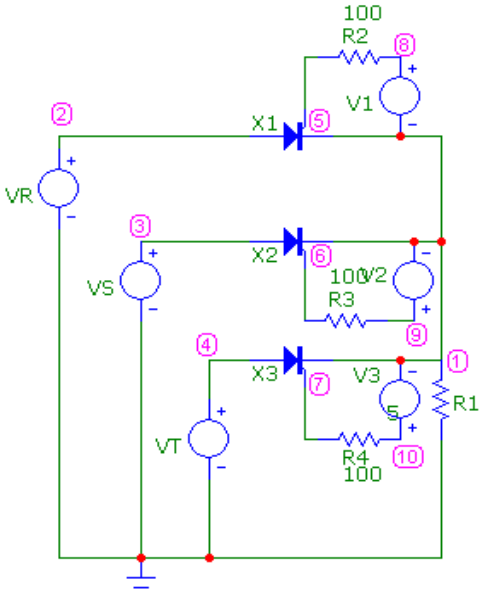


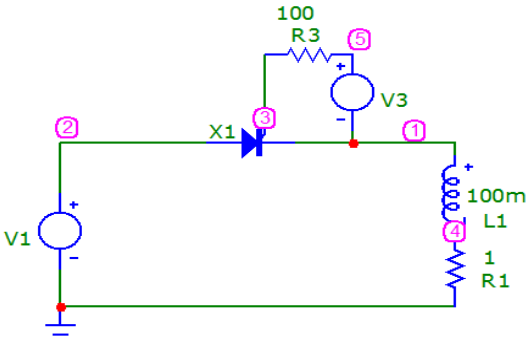


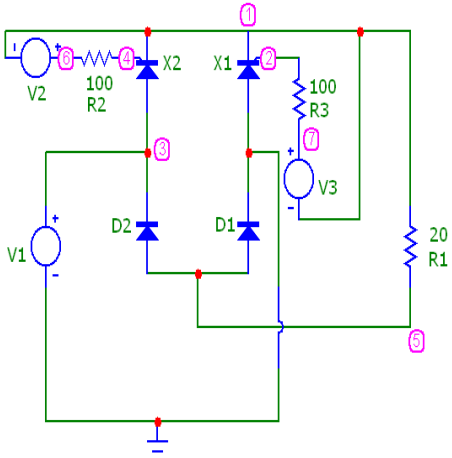
ELECTRONICA DE POTENCIA- CONVERTIDORES

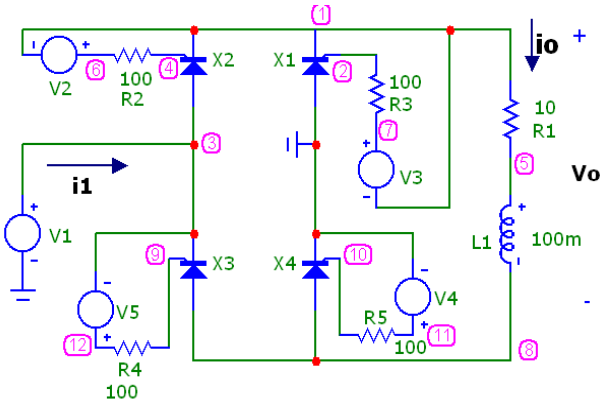
RECTIFICADORES

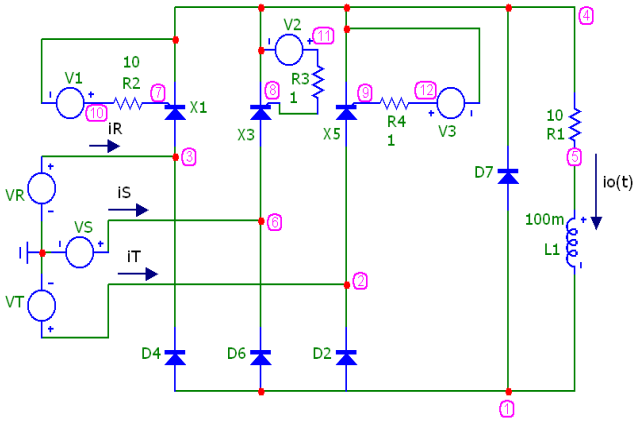




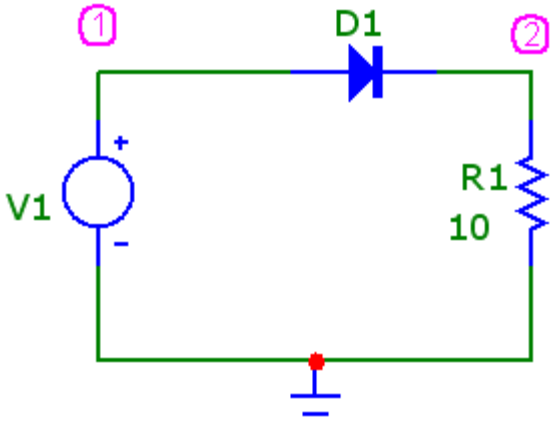




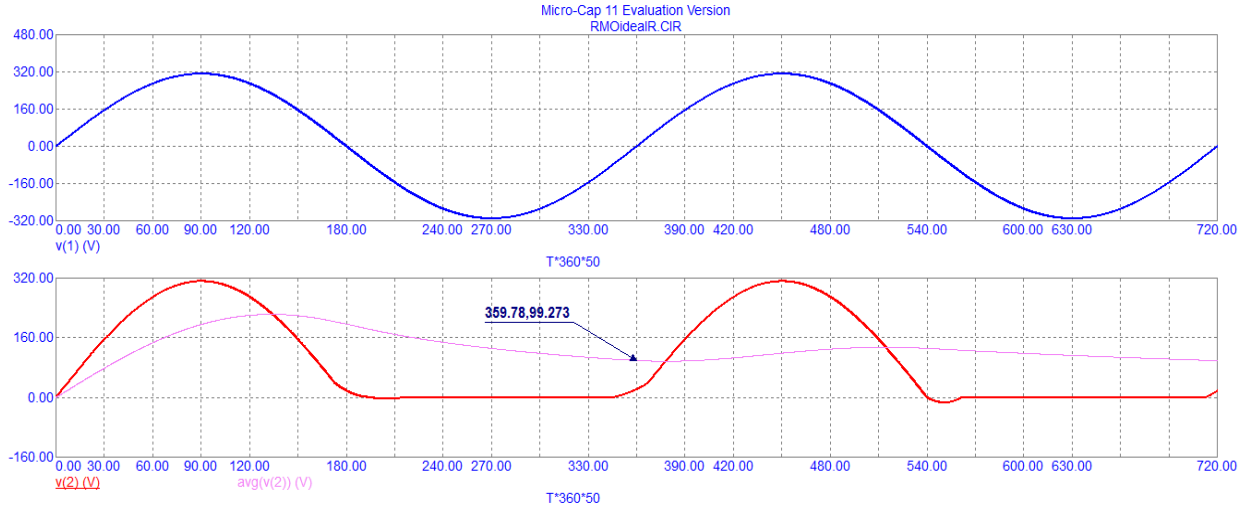




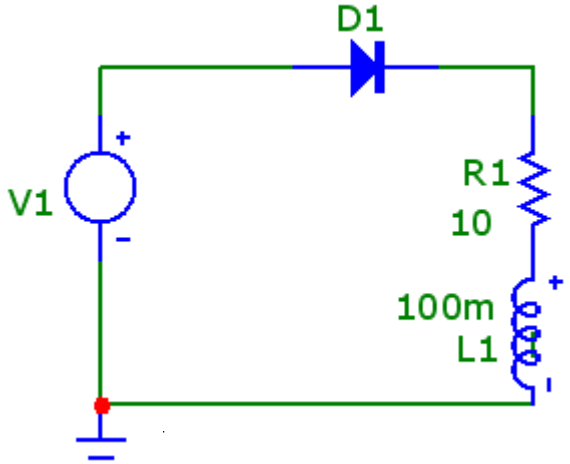
Rectificador Monofásico No controlado de Media Onda con Carga Resistiva



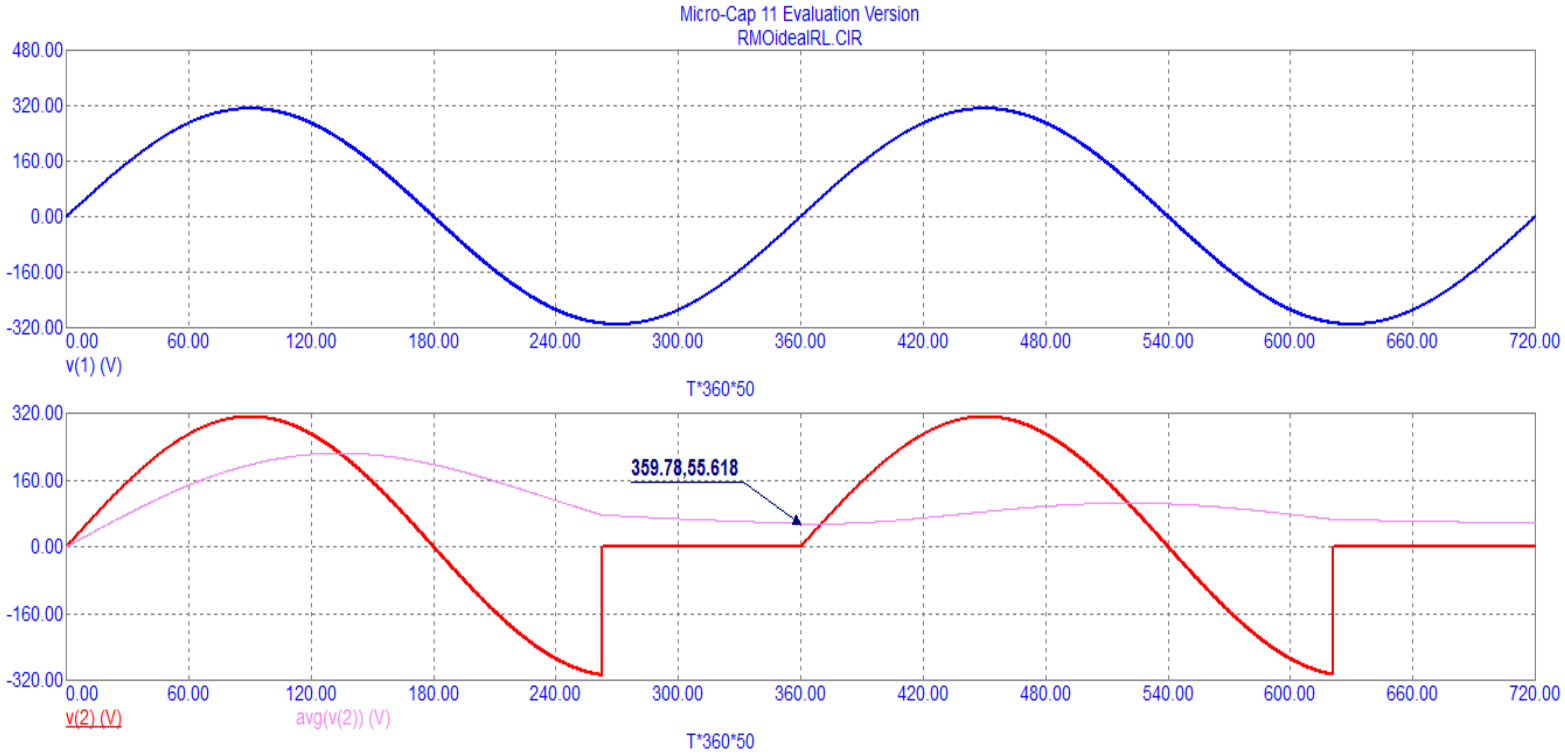
$$V_{DC} = \frac{1}{2\pi}\int_0^{\pi} V_m sen(wt)dt = \frac{V_m}{\pi} = 0.31830V_m$$



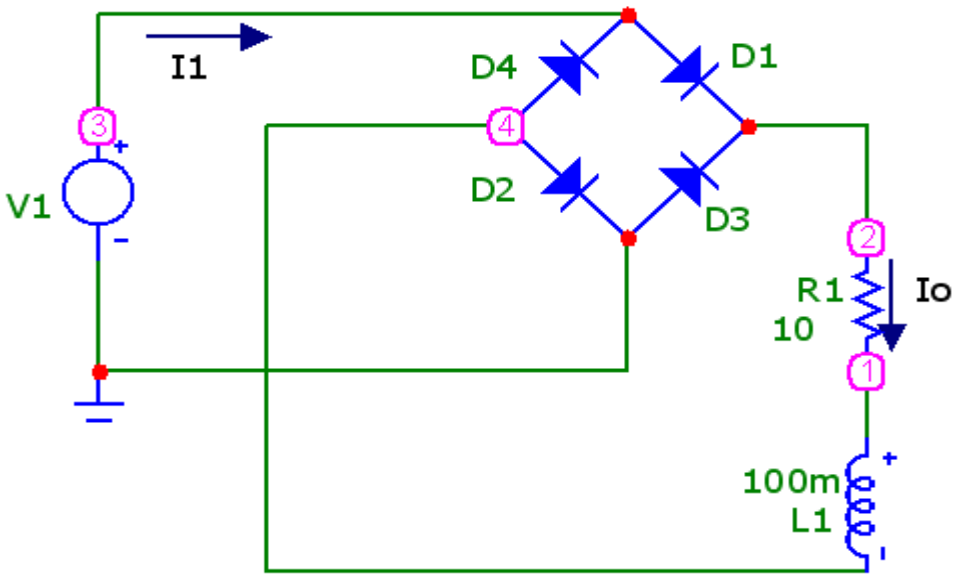
Rectificador Monofásico No controlado de Media Onda con Carga R-L



$$V_{DC} = \frac{1}{2\pi}\int_{0}^{\pi+\delta} V_m sen(wt)dt = \frac{V_m}{2\pi}\left[1-\cos(\pi+\delta)\right]$$

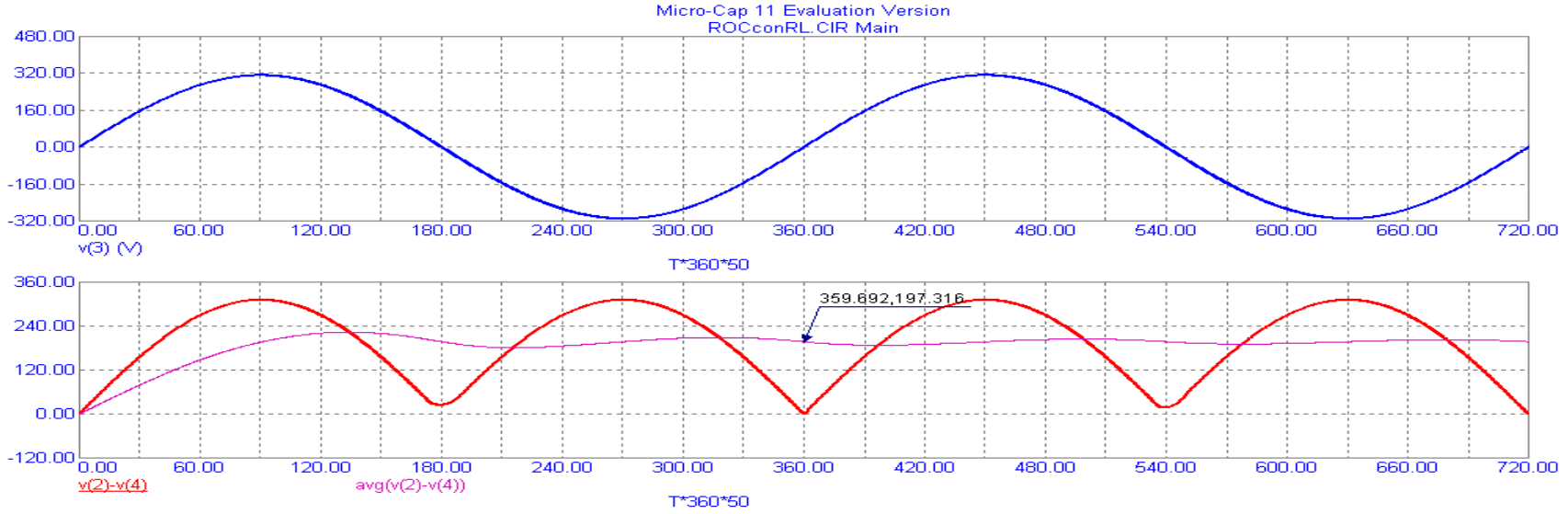


Rectificador Monofásico No controlado de Onda Completa con Carga R-L

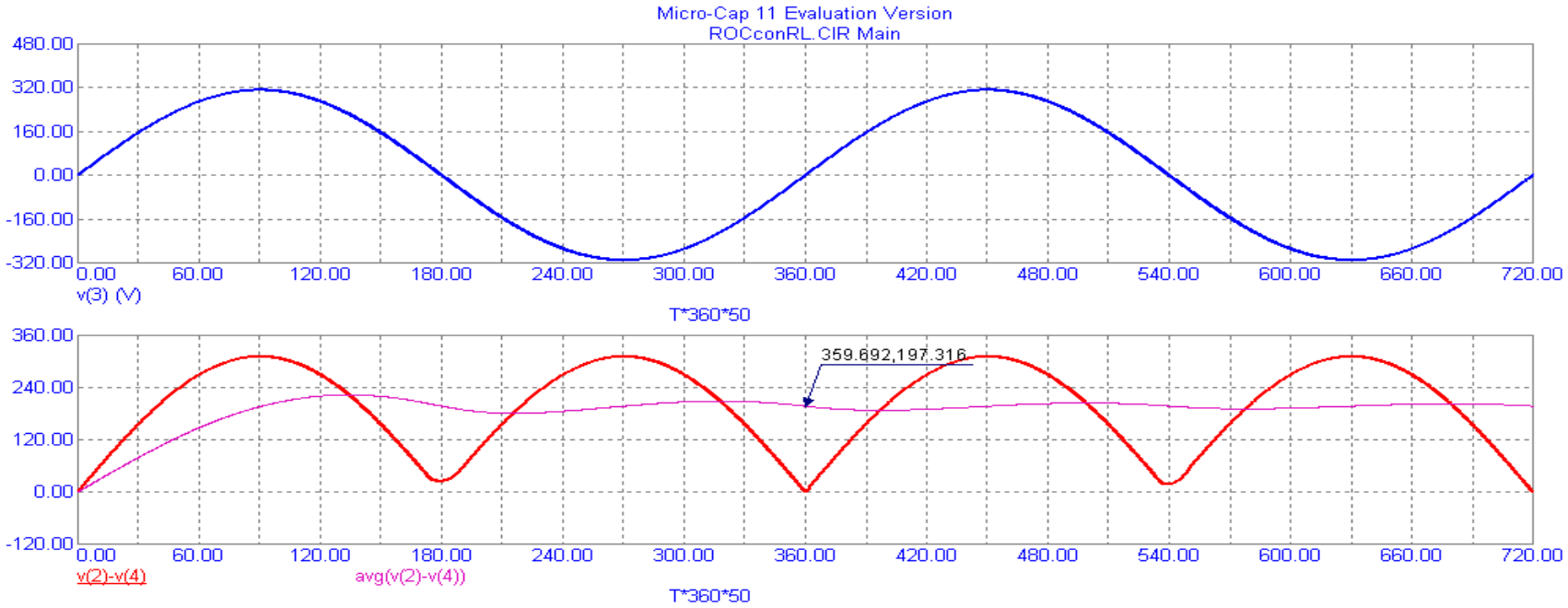


$$V_{DC} = V_{2\_4} = \frac{2}{2\pi}\int_0^{\pi} V_m sen(wt)dt =$$

$$\frac{2V_m}{\pi} = 0.6366V_m$$



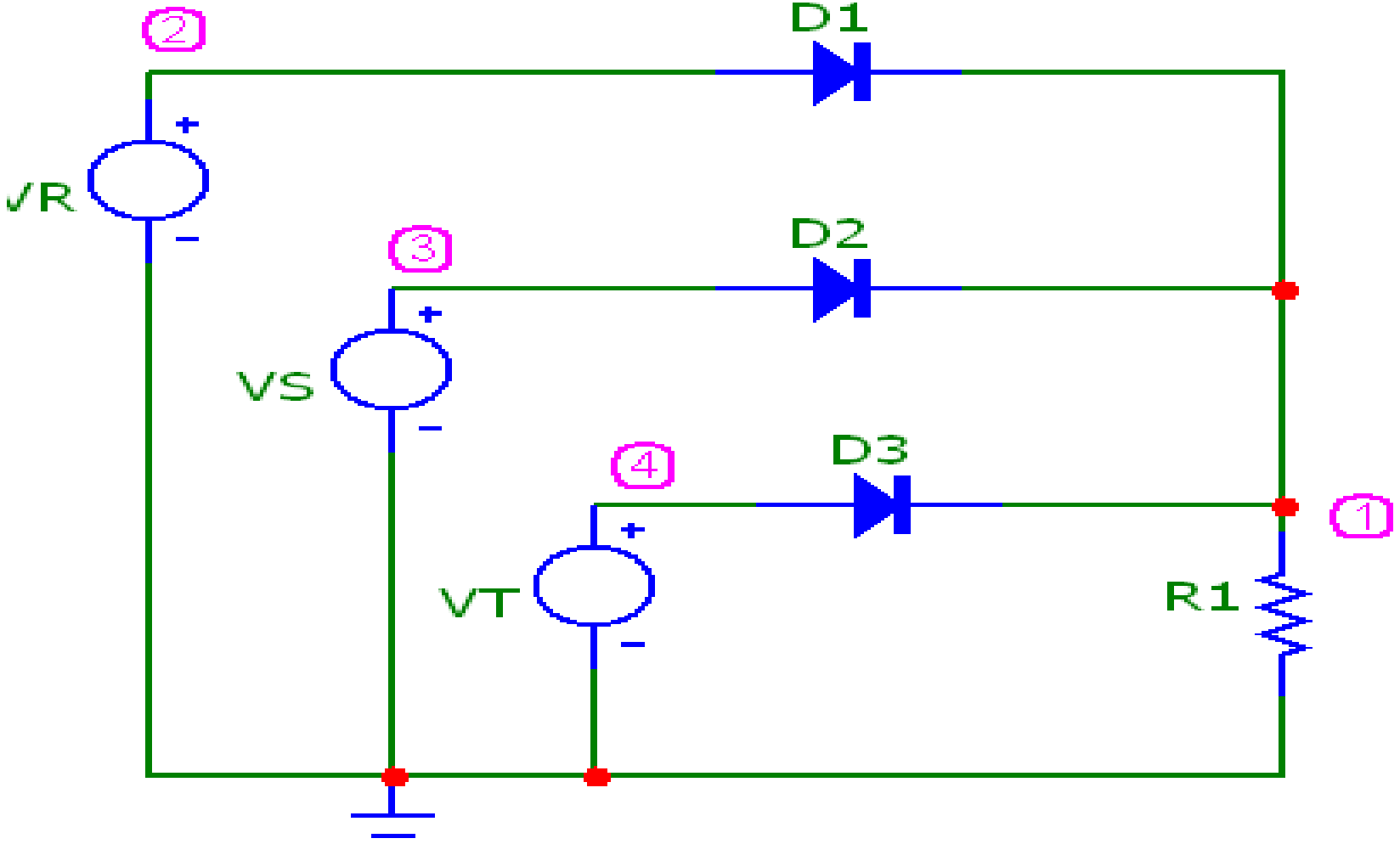
Rectificador Monofásico No controlado de Onda Completa con Carga R-L



$$V_{DC} = V_{2\_4} = \frac{2}{2\pi}\int_0^{\pi} V_m sen(wt)dt = \frac{2V_m}{\pi} = 0.6366V_m$$

$$V_{2\_4} = \frac{2V_m}{\pi} + \sum_{n=2,4...}^{\infty} a_n \cos(wt) = \frac{2V_m}{\pi} - \frac{4V_m}{3\pi}\cos(2wt) - \frac{4V_m}{15\pi}\cos(4wt) - \frac{4V_m}{35\pi}\cos(6wt) + ...$$

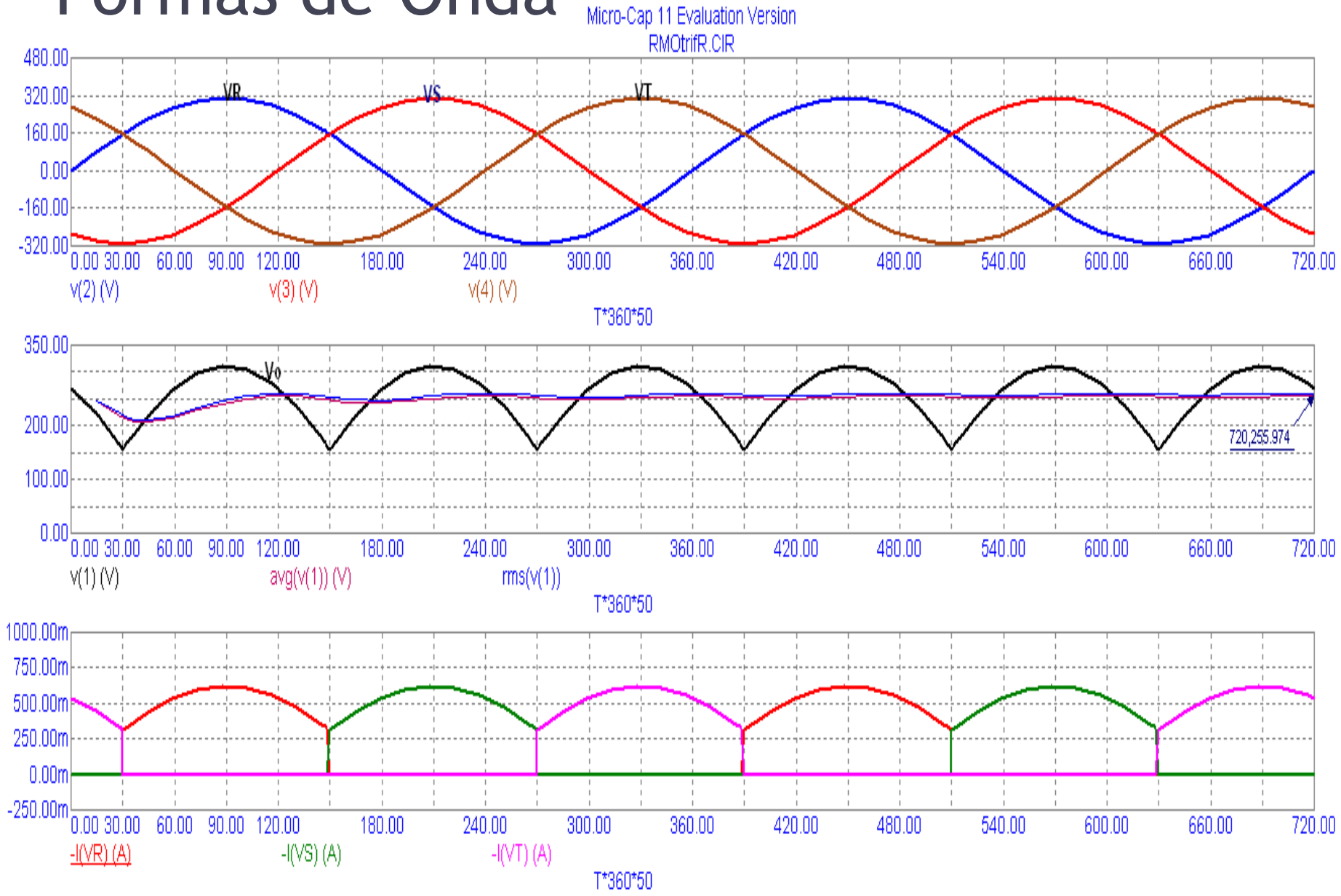
Rectificador Trifásico media onda



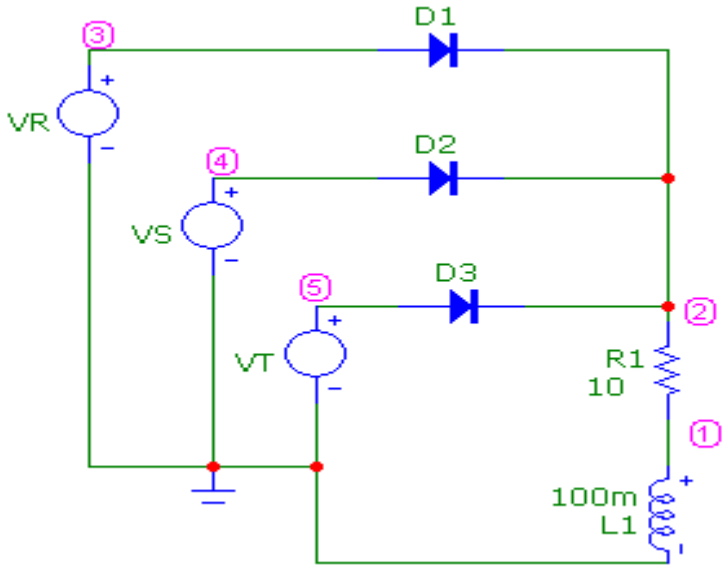
Vcd= 3Vm/π*seno(π/3)= **257,2** v

Vrms= 261,5 v

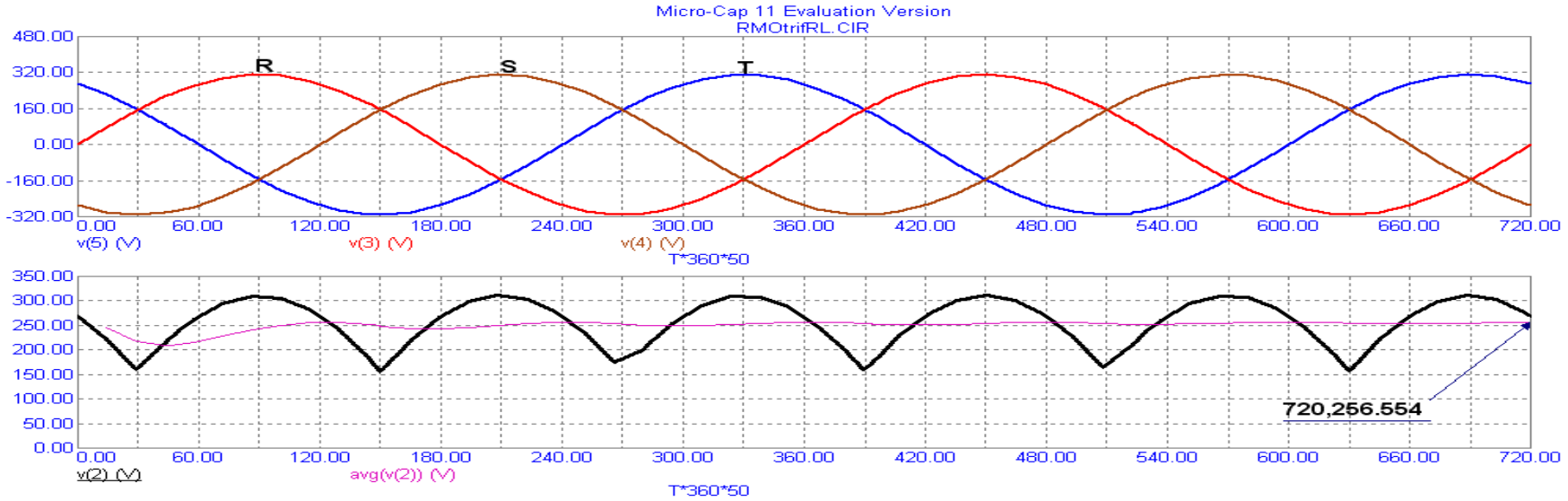
Formas de Onda



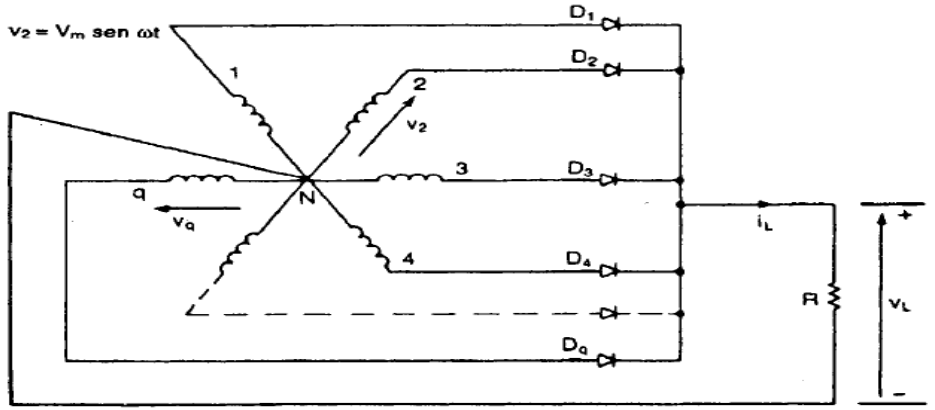
Rectificador Trifásico No controlado de Media Onda con Carga R-L

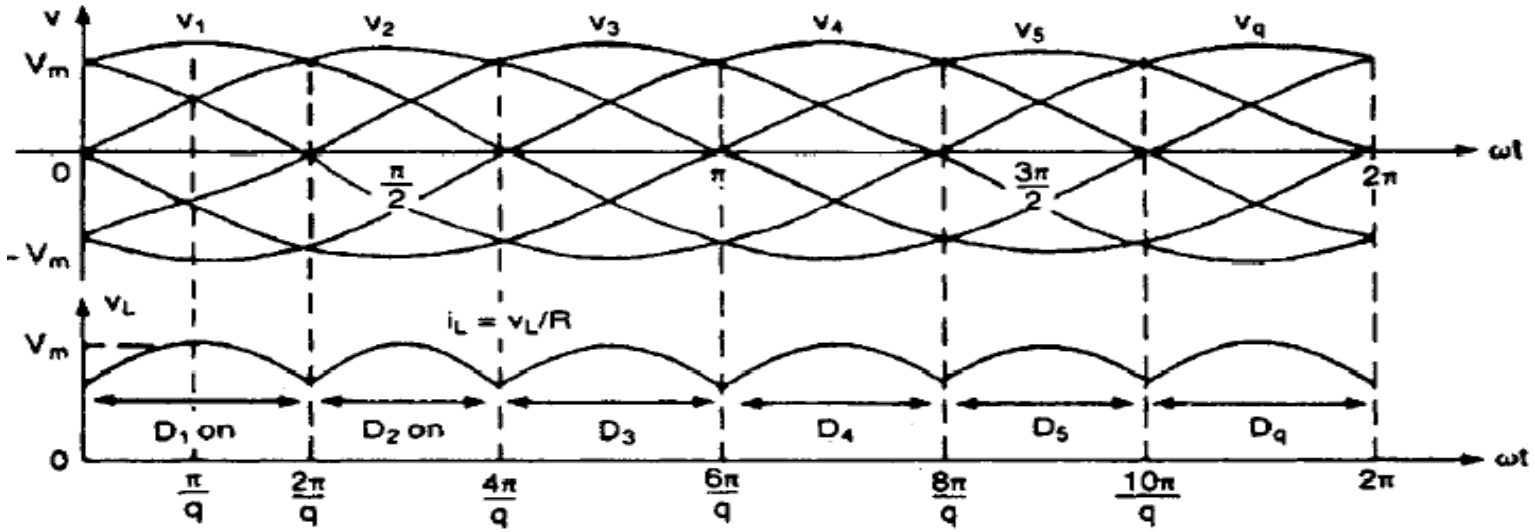


$$Vcd = \frac{3 * Vm}{\pi} sen(\frac{\pi}{3})$$



Rectificador Polifásico Media Onda



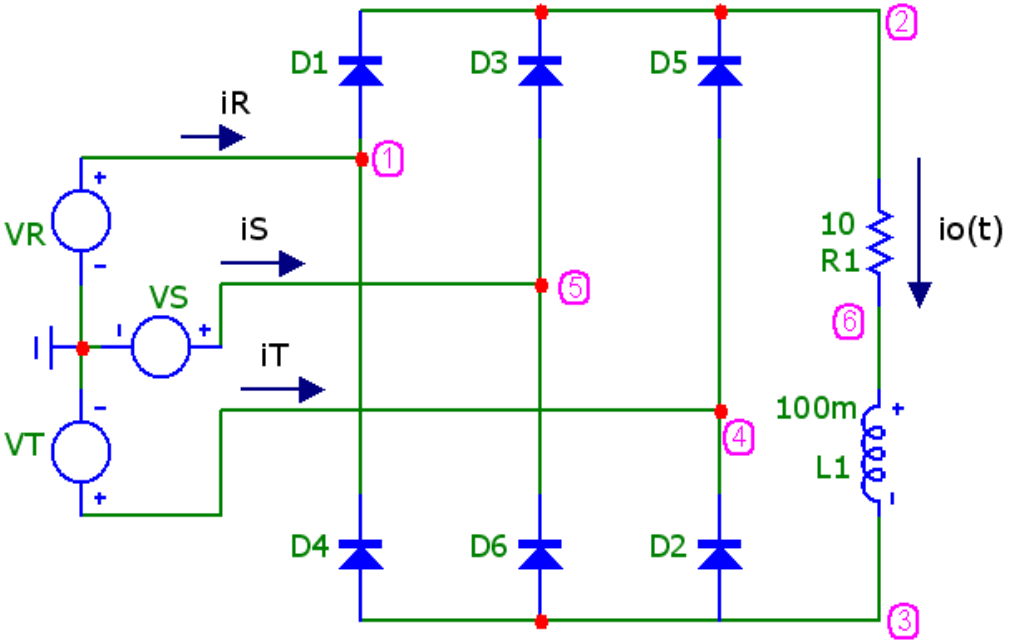


$$V_{cd} = \frac{2}{2\pi/q}\int_0^{\pi/q} V_m \cos \omega t \, d(\omega t) = V_m \frac{q}{\pi} \operatorname{sen} \frac{\pi}{q}$$

$$V_{rms} = \left[\frac{2}{2\pi/q}\int_0^{\pi/q} V_m^2 \cos^2 \omega t \, d(\omega t)\right]^{1/2}$$

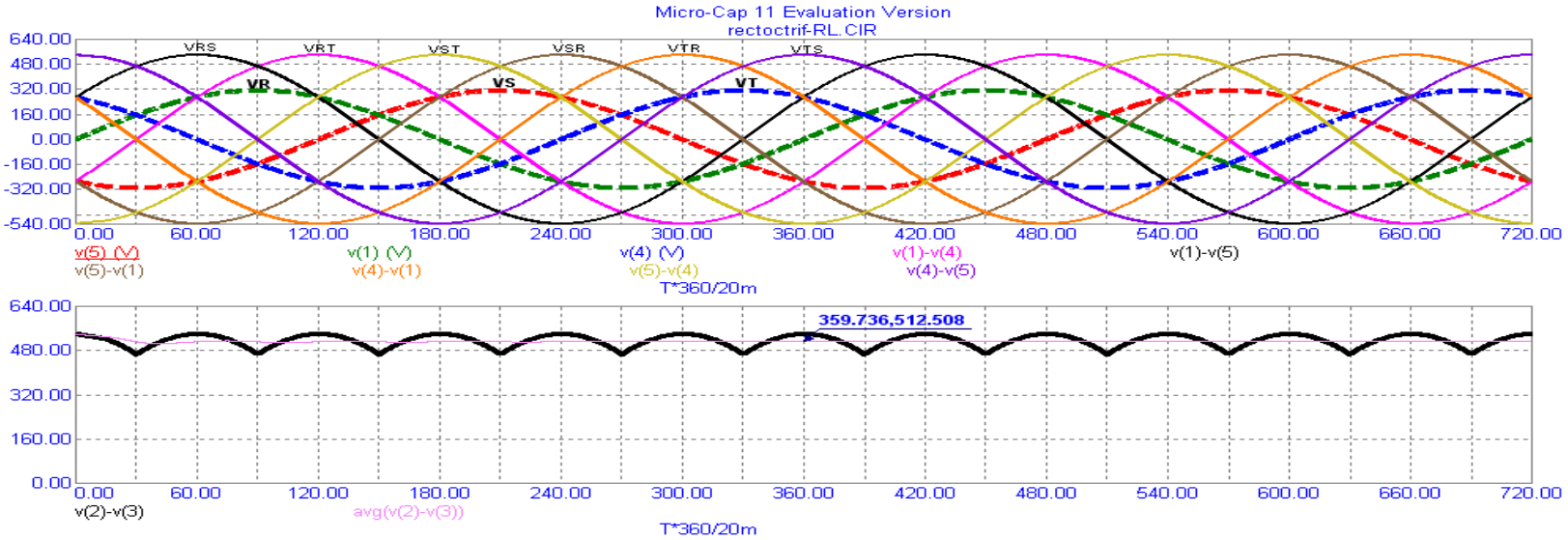
$$= V_m \left[\frac{q}{2\pi}\left(\frac{\pi}{q} + \frac{1}{2}\operatorname{sen}\frac{2\pi}{q}\right)\right]^{1/2}$$

Rectificador Trifásico No controlado de Onda Completa con Carga R-L

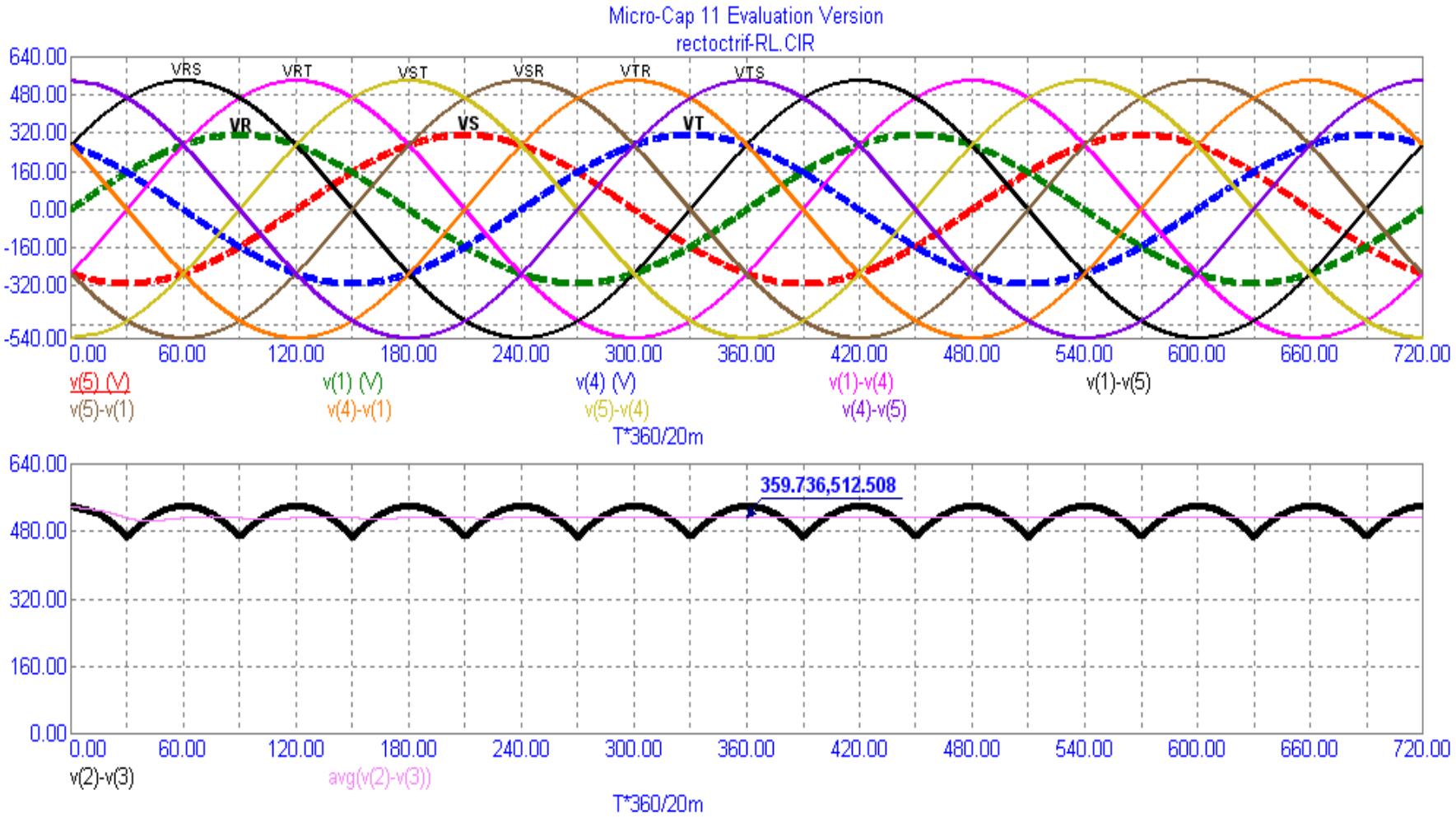


$$Vcd = \frac{2 * 6}{2\pi} \int_0^{\pi/6} \sqrt{3}\, Vm \cos(wt)\, dwt$$

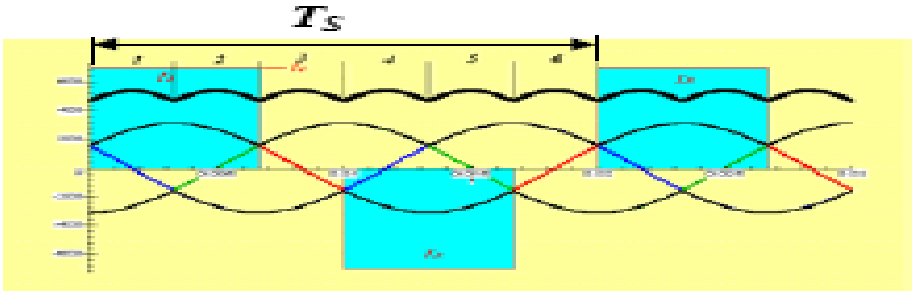
$$= \frac{3\sqrt{3}}{\pi} Vm = 1,654\, Vm$$

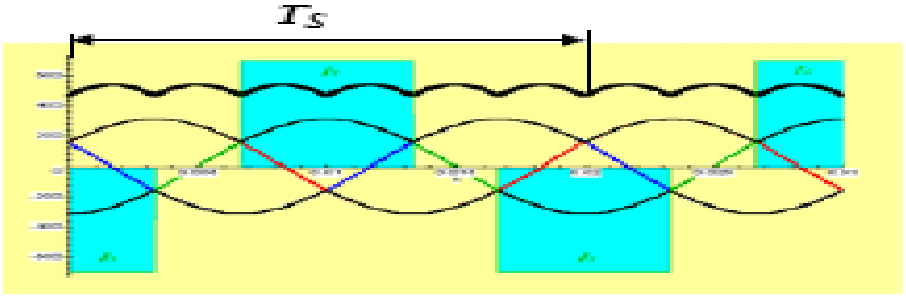


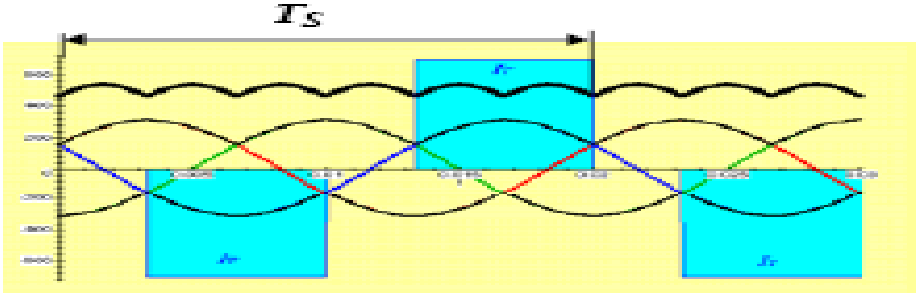
Rectificador Trifásico No controlado de Onda Completa con Carga R-L

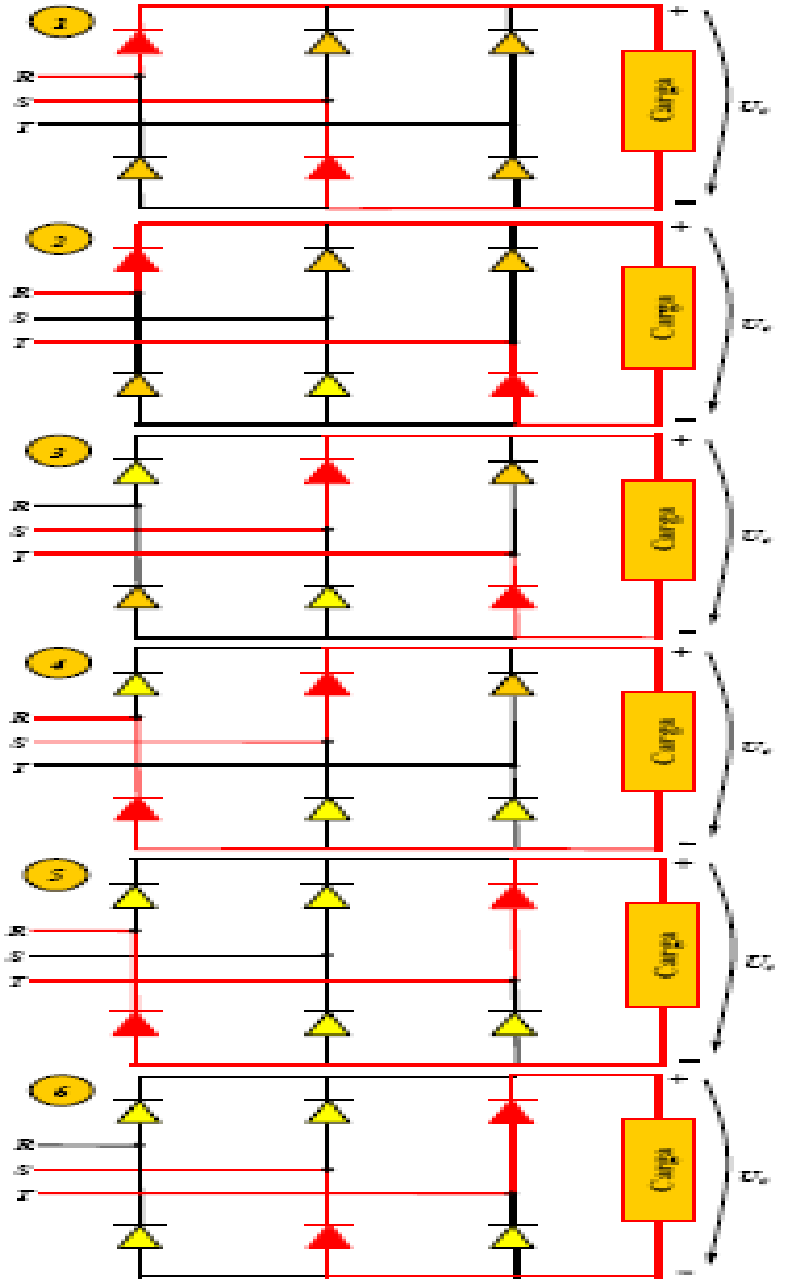


Rectificador Trifásico de onda completa

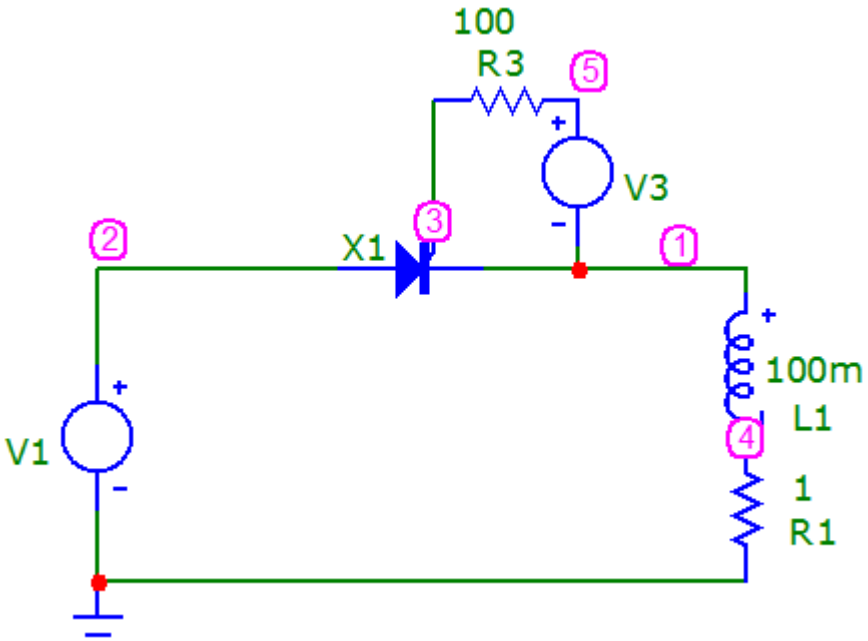






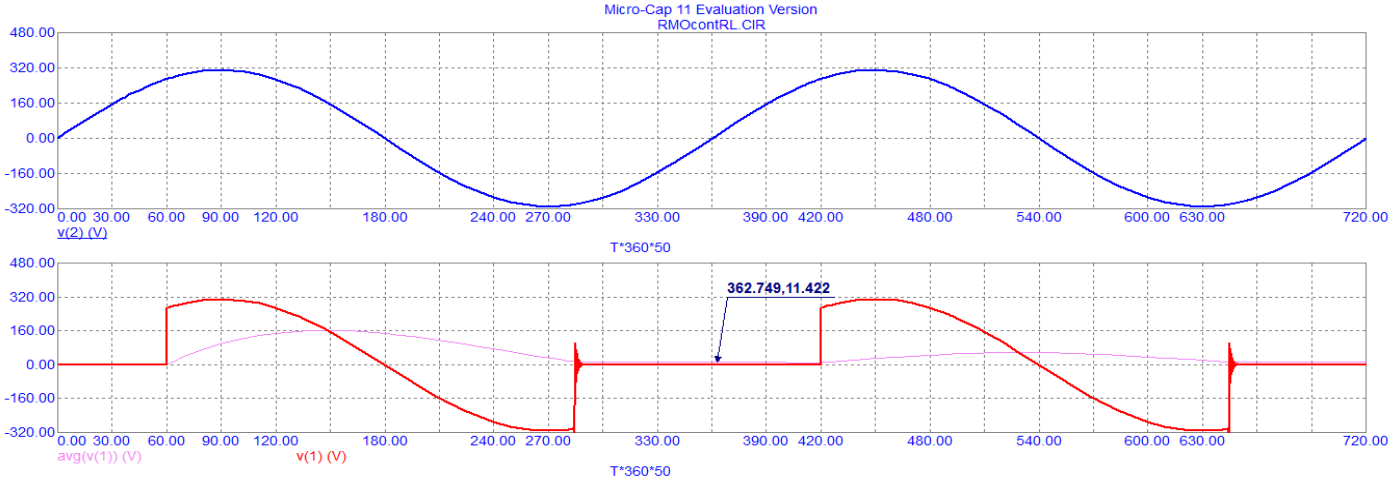


Rectificador Monofásico Controlado de Media Onda con Carga RL

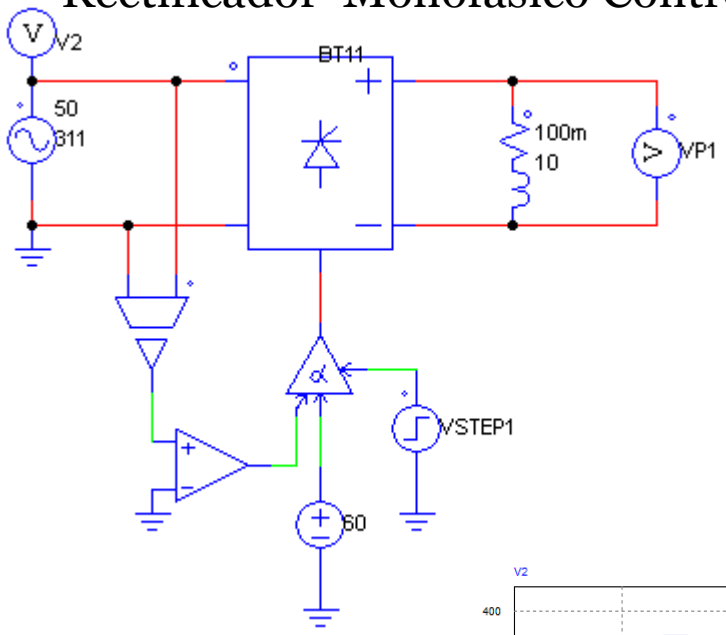


$$Vcd = \frac{1}{2\pi}\int_{\alpha}^{\beta} Vm\ sen(wt)\ dwt$$

$$= \frac{Vm}{2\pi}[cos\alpha - cos\beta]$$



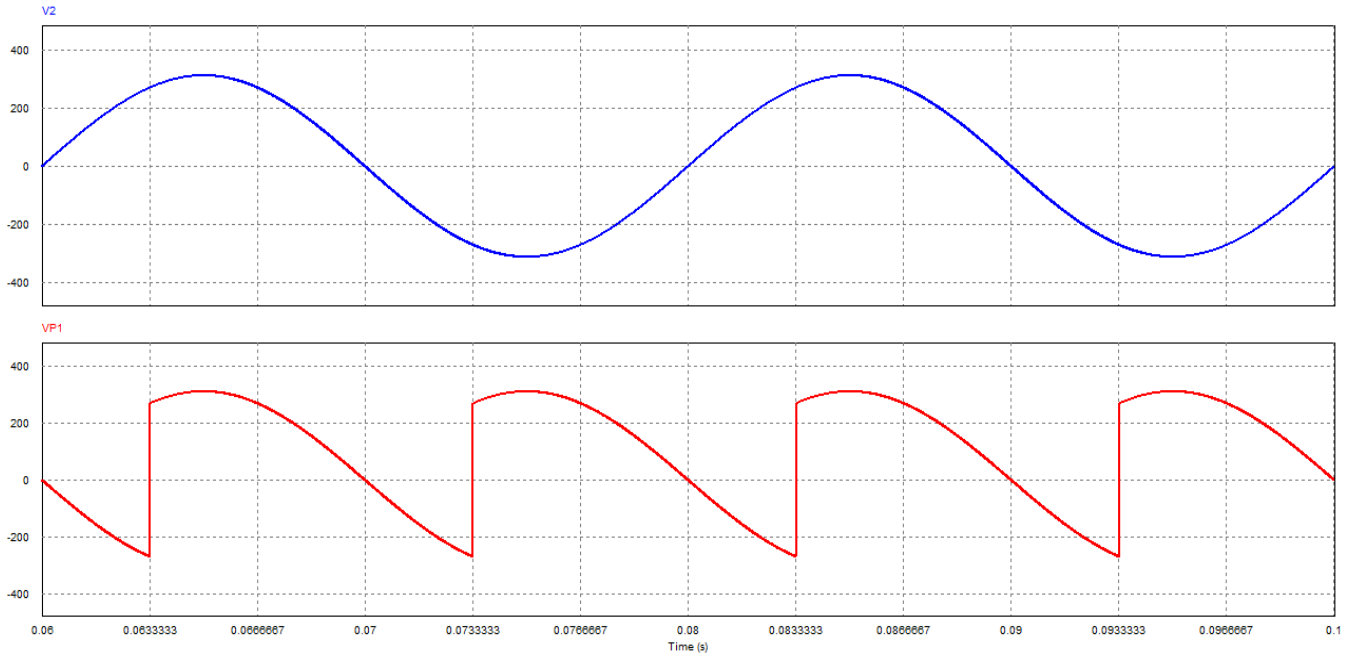
Rectificador Monofásico Controlado de Onda Completa con Carga R-L



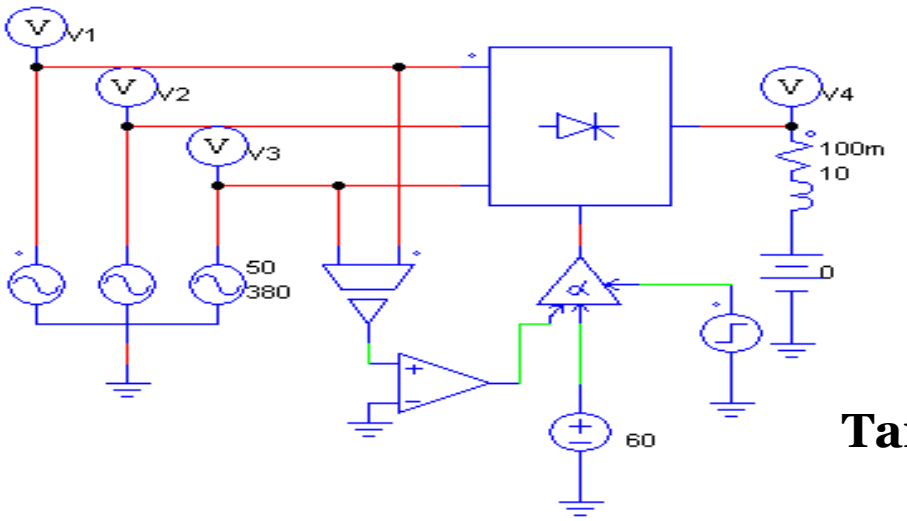
$$V_{DC} = \frac{2}{2\pi}\int_{\alpha}^{\pi+\alpha} V_m sen(wt)dt = \frac{2V_m}{\pi}\cos\alpha$$

Para carga Resistiva pura:

$$V_{DC} = \frac{2}{2\pi}\int_{\alpha}^{\pi} V_m sen(wt)dt = \frac{V_m}{\pi}(1+\cos\alpha)$$



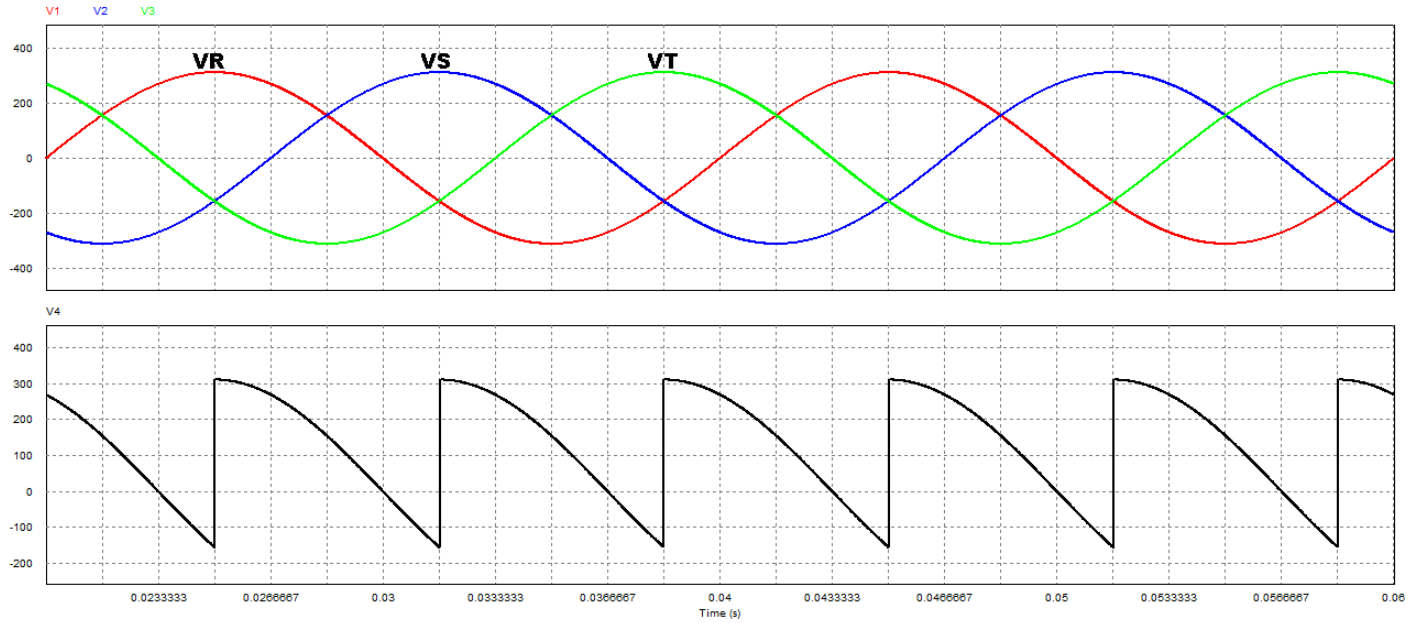
Rectificador Trifásico Controlado de Media Onda con Carga R-L



$$Vcd = \frac{3}{2\pi}\int_{\frac{\pi}{6}+\alpha}^{\frac{5\pi}{6}+\alpha} Vm\, sen(wt)dwt =$$

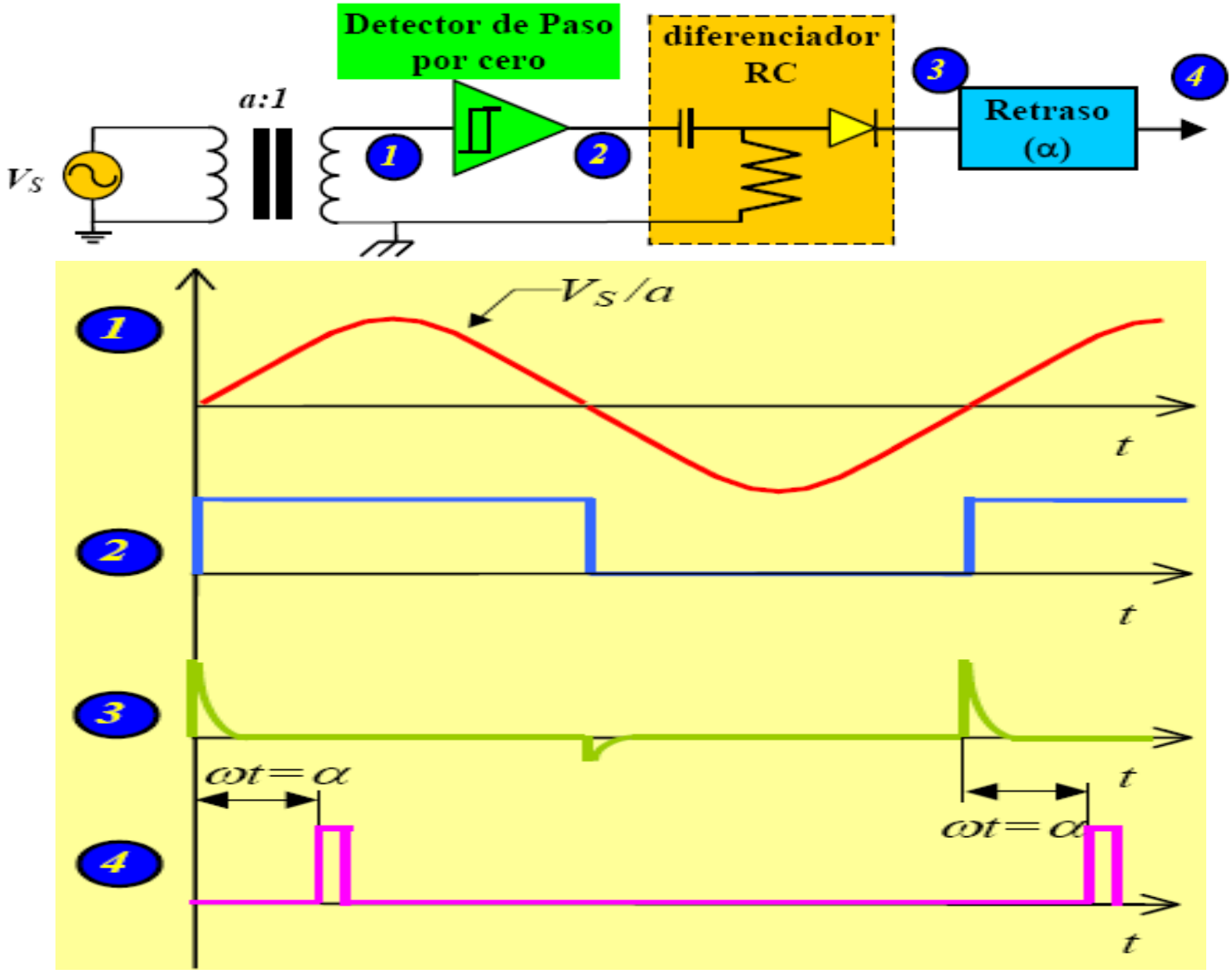
$$= \frac{3\sqrt{3}\,Vm}{2\pi}cos\alpha$$

También vale para carga R con $\alpha \leq \pi/6$

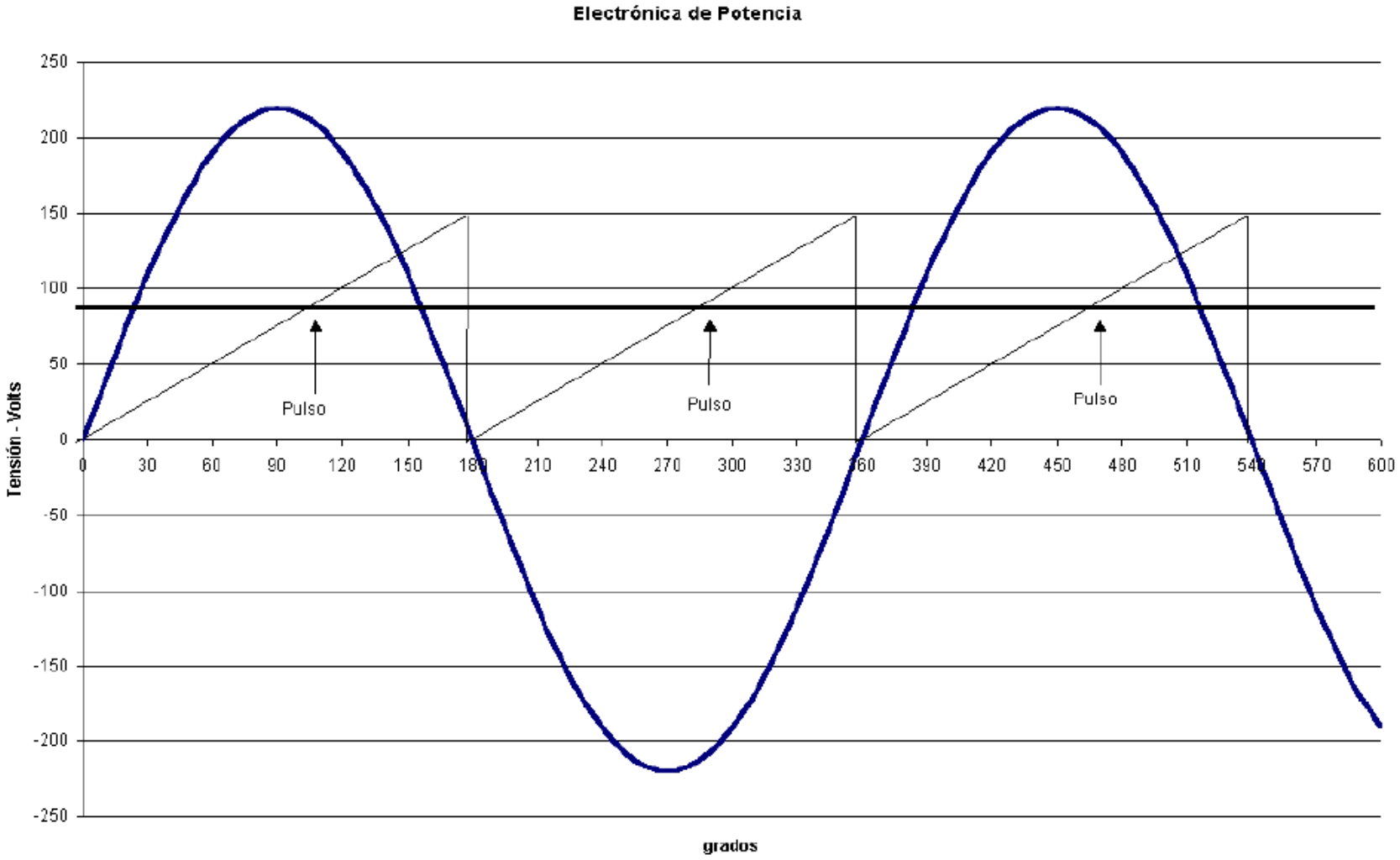


Voavg= 127,28v

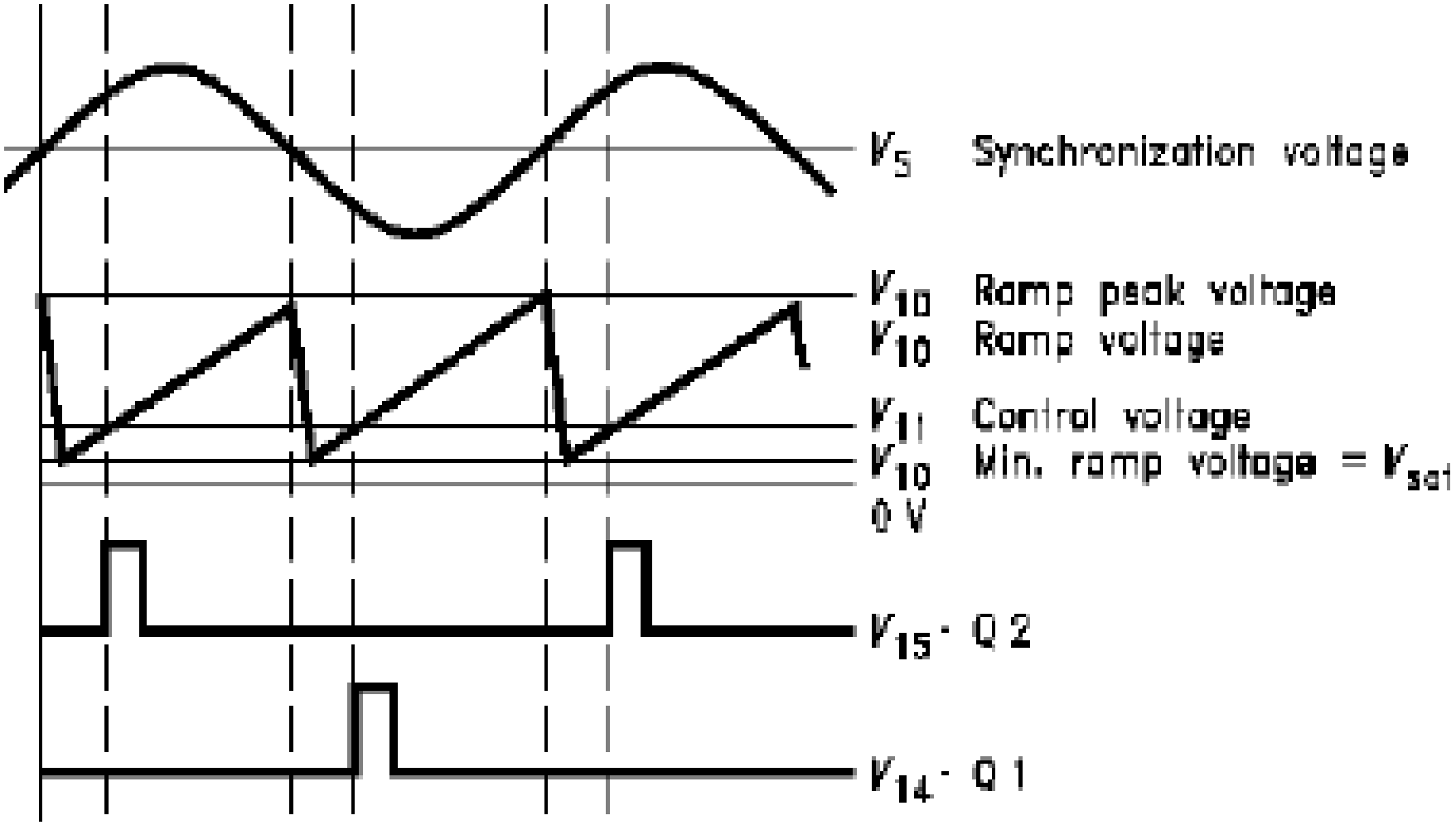
Sincronización disparo



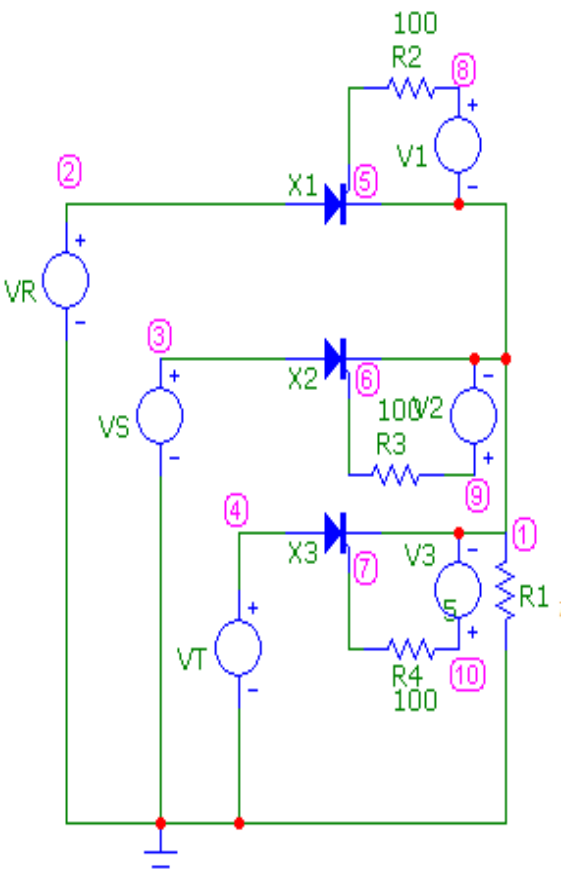
Sincronización disparo

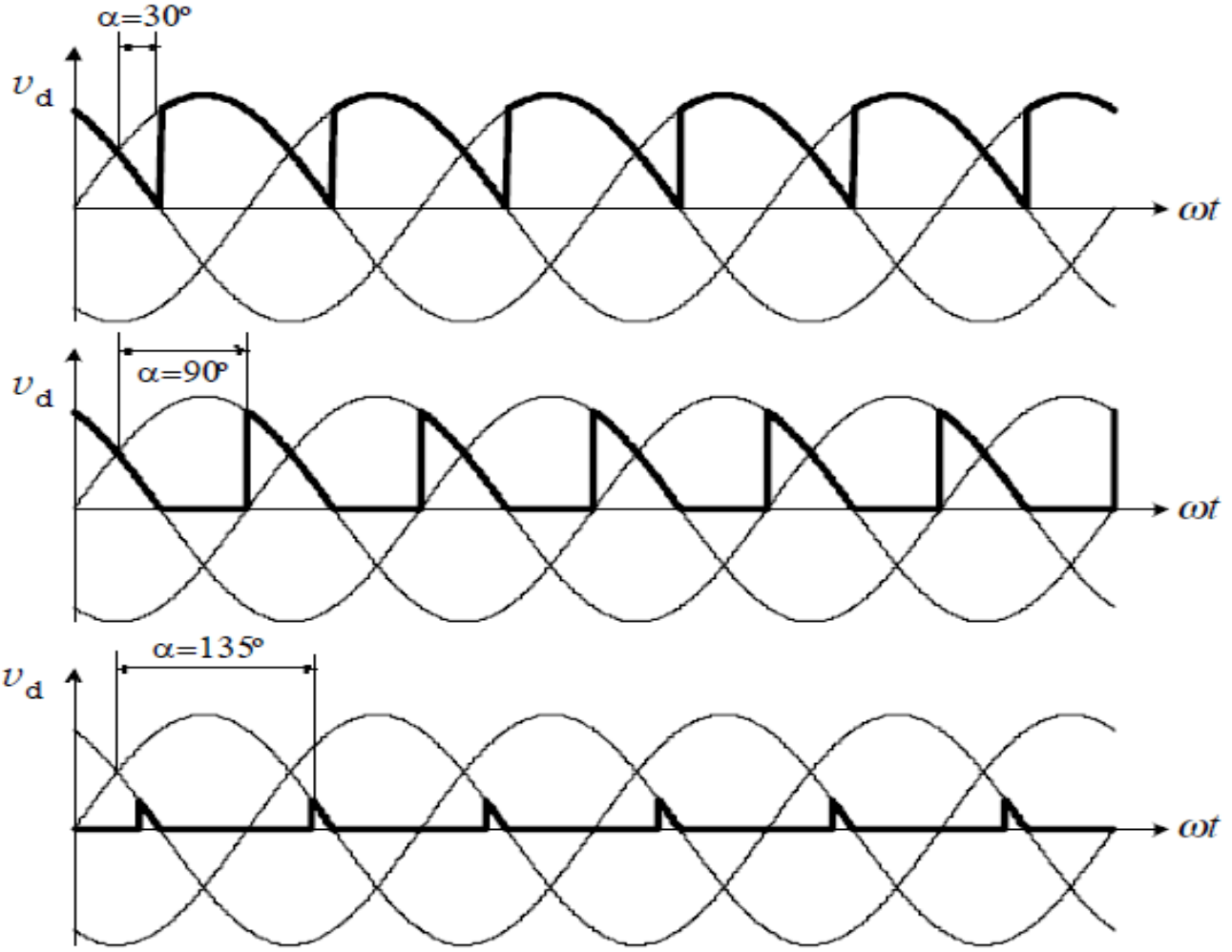


Sincronización disparo



RMO Trifásico controlado carga R

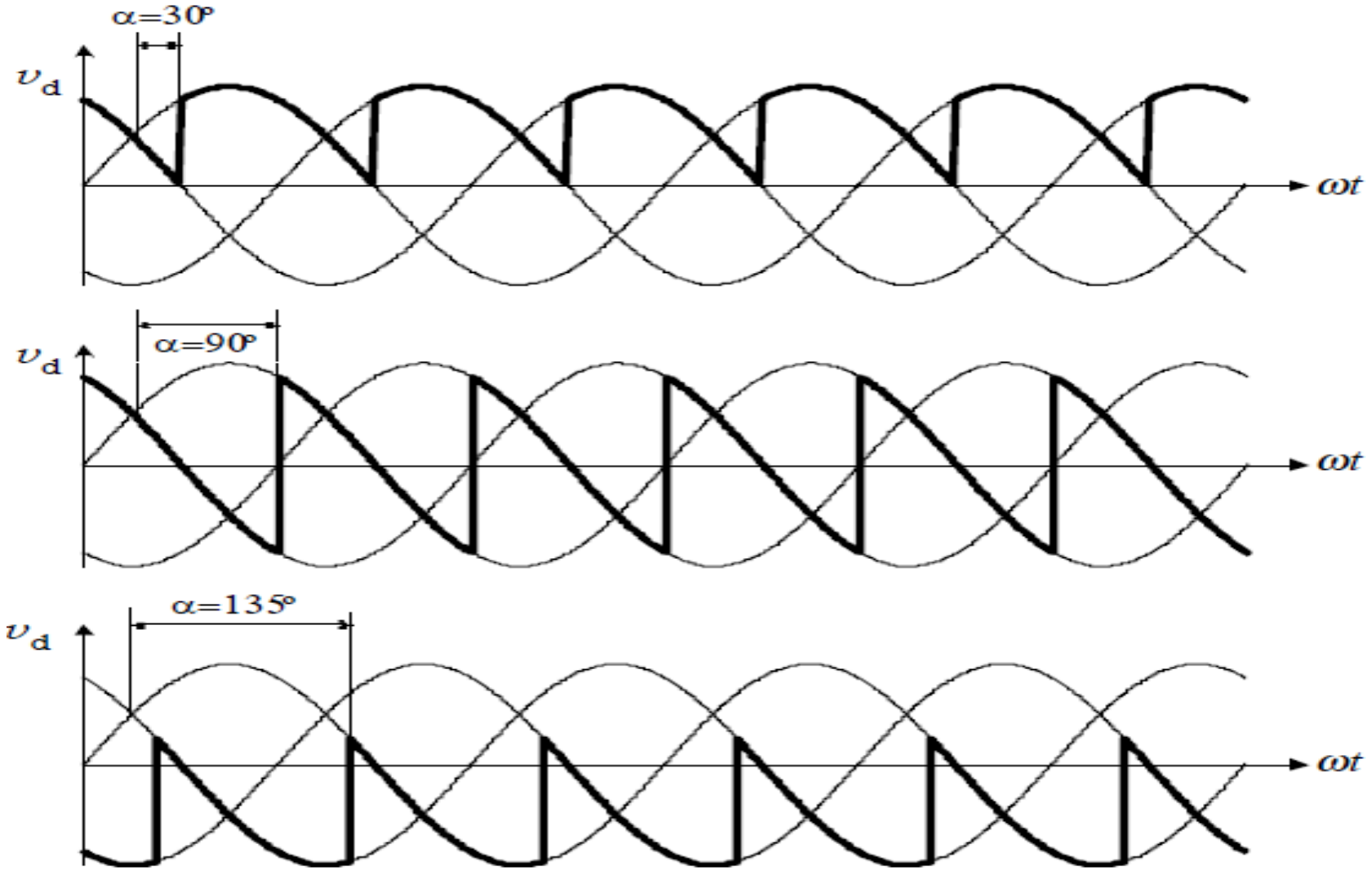




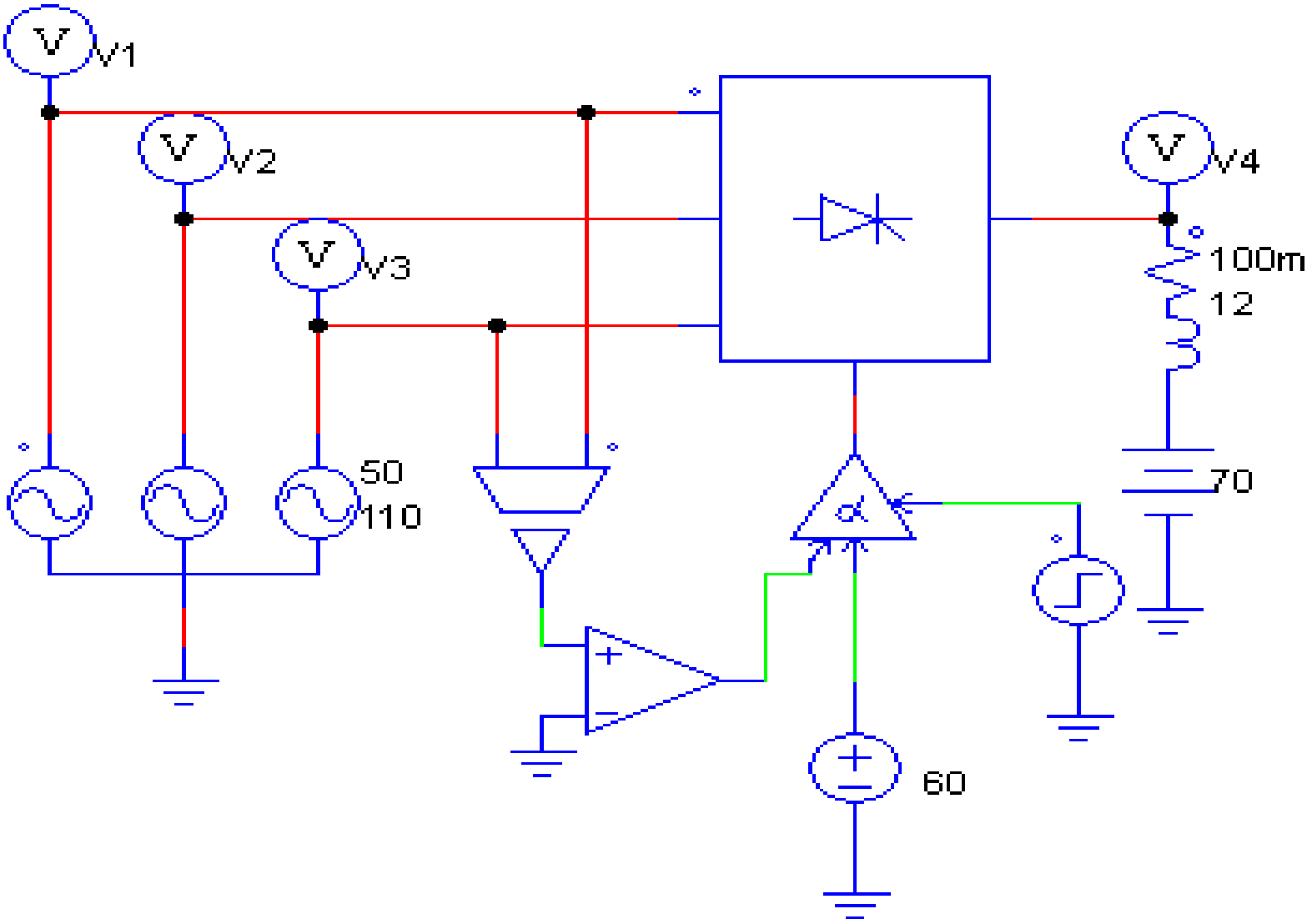
Para una carga resistiva y α ≥ π/6

$$Vcd = \frac{3}{2\pi}\int_{\frac{\pi}{6}+\alpha}^{\pi} Vm\, sen(wt)dwt = \frac{3Vm}{2\pi}\left[1 + cos(\frac{\pi}{6} + \alpha)\right]$$

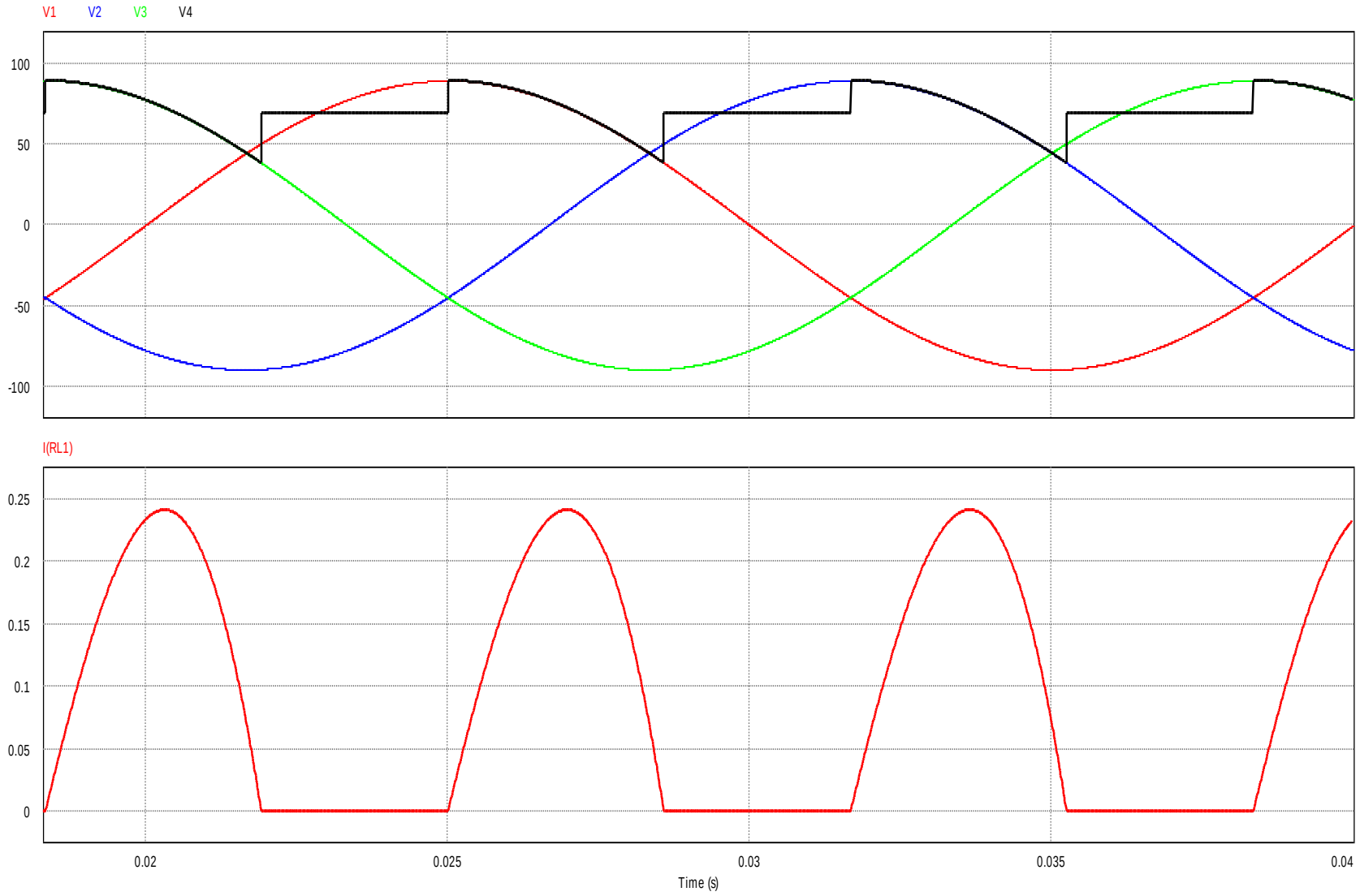
RMO Trifásico carga altamente inductiva



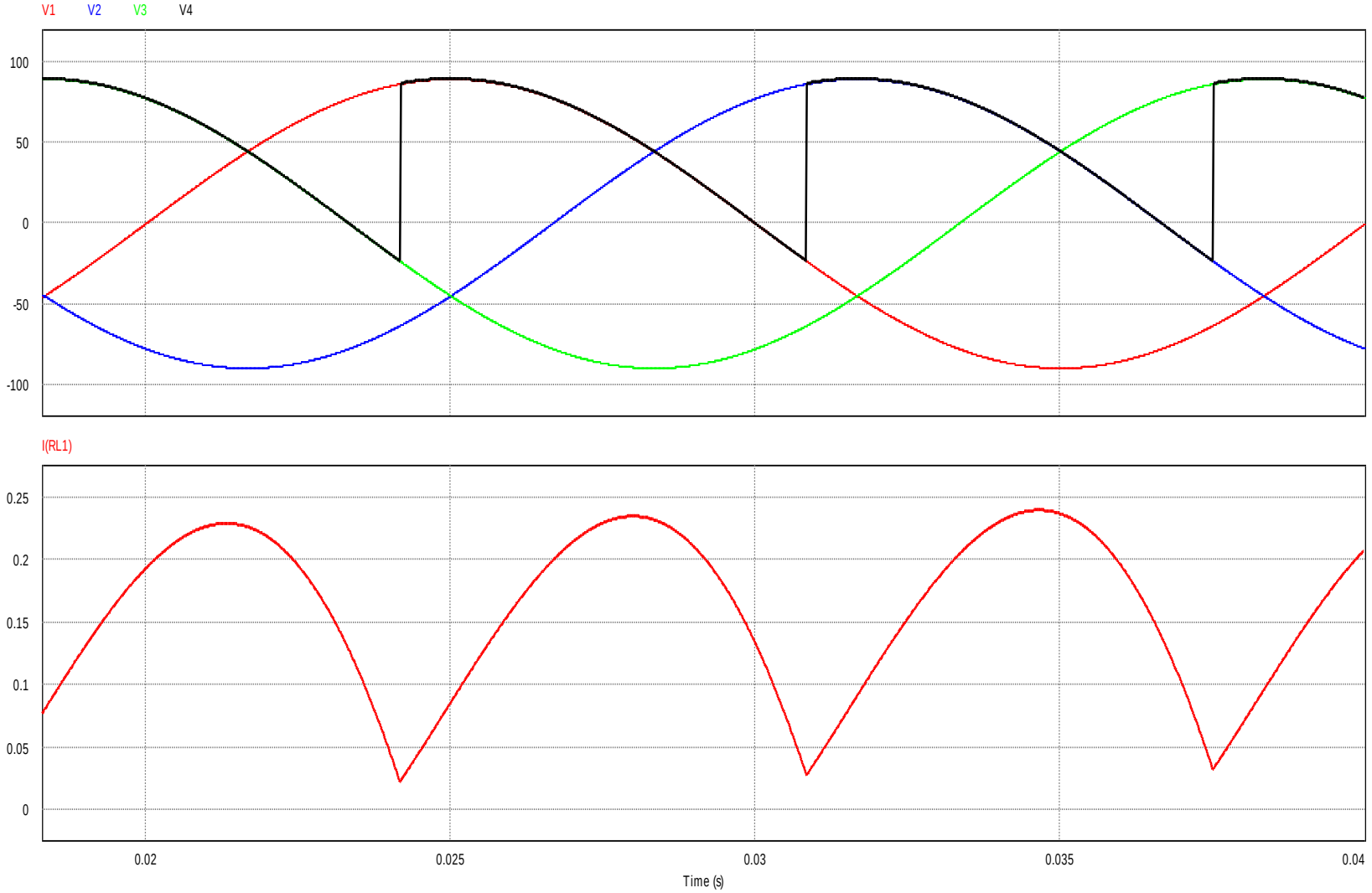
RMO Trifásico Controlado



RMO Trifásico- Corr. Discontinua



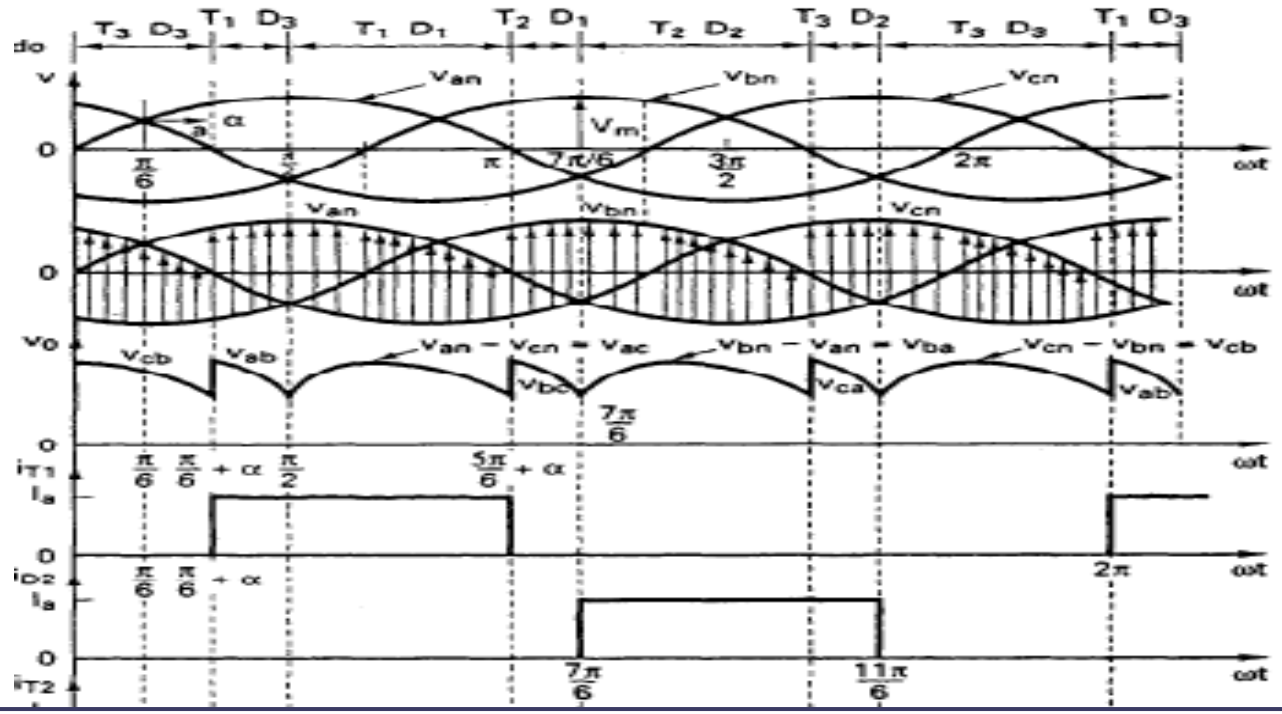
RMO Trifásico- Corr. Continua



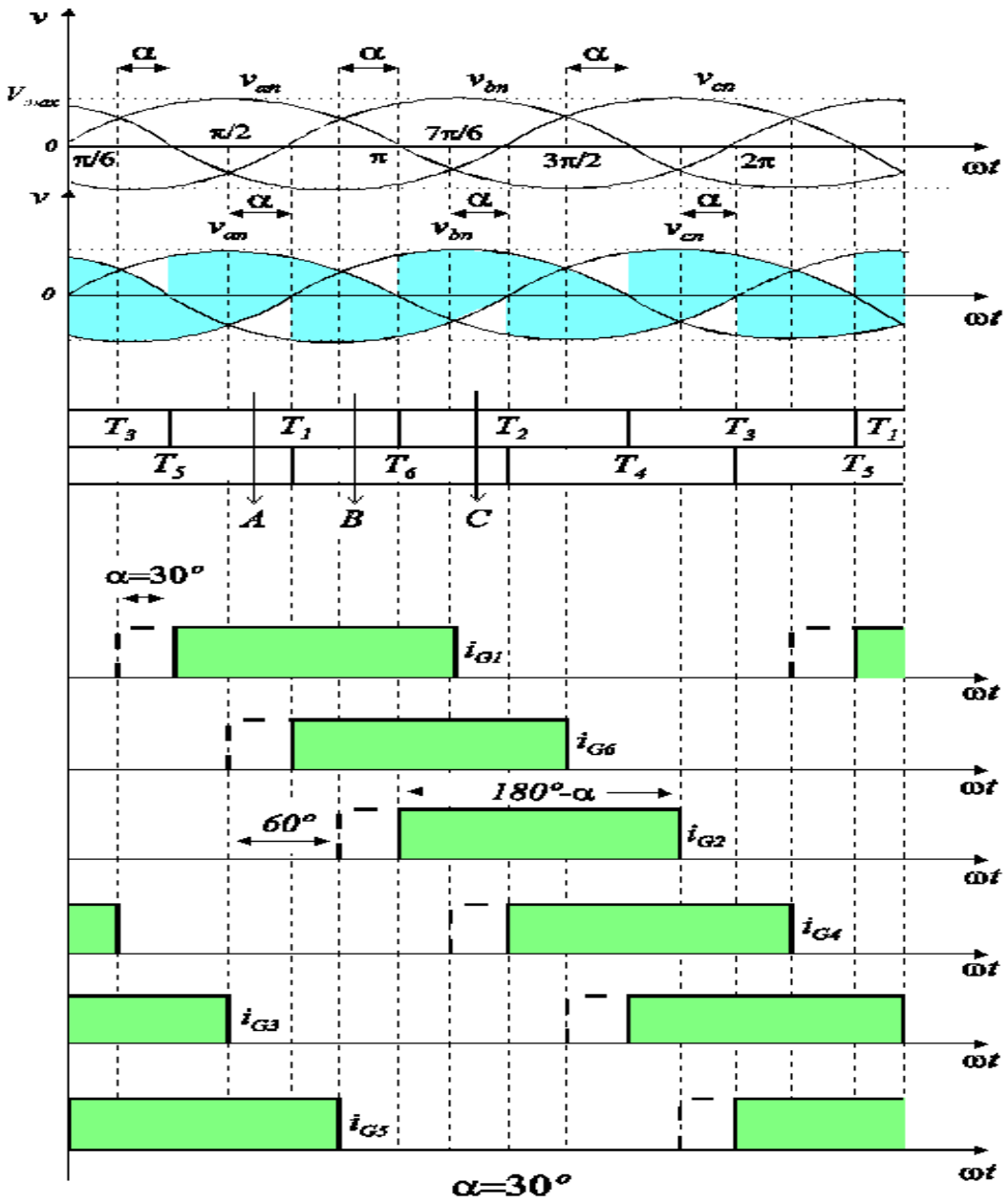
α = 45º , L= 500 mHy, Vcc = 50 v

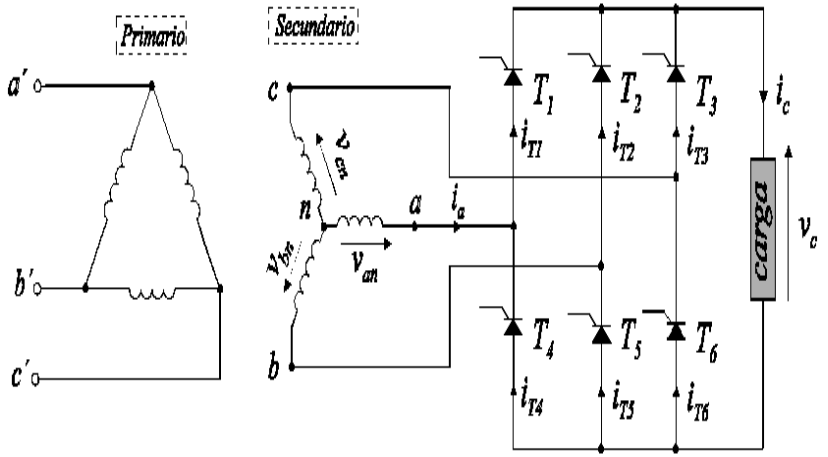
ROC semicontrolado α≤ 60°

$$Vcd = \frac{3}{2\pi}\left[\int_{\frac{\pi}{6}+\alpha}^{\pi/2} Vab\, d(wt) + \int_{\pi/2}^{\frac{5\pi}{6}+\alpha} Vac\, d(wt)\right] = \frac{3\sqrt{3}\,Vm}{2\pi}(1+cos\alpha)$$



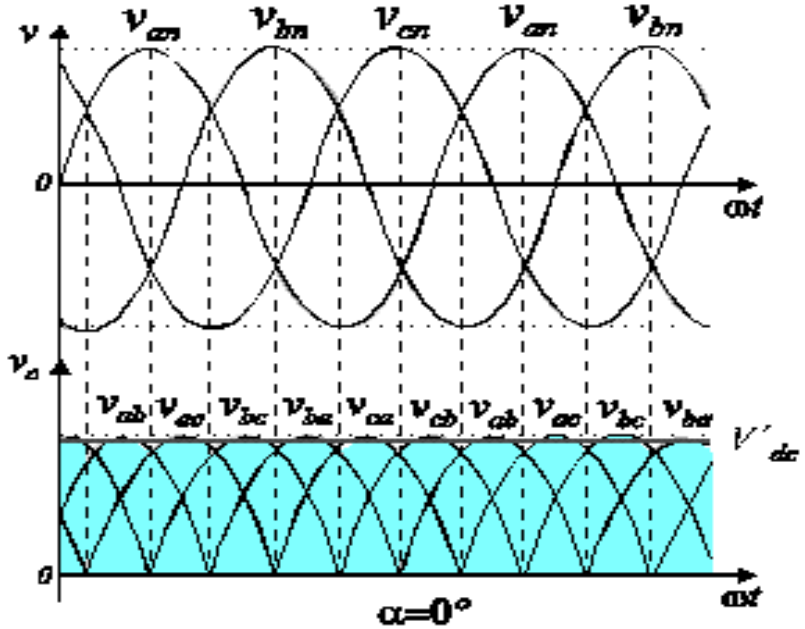
ROC totalmente controlado carga R

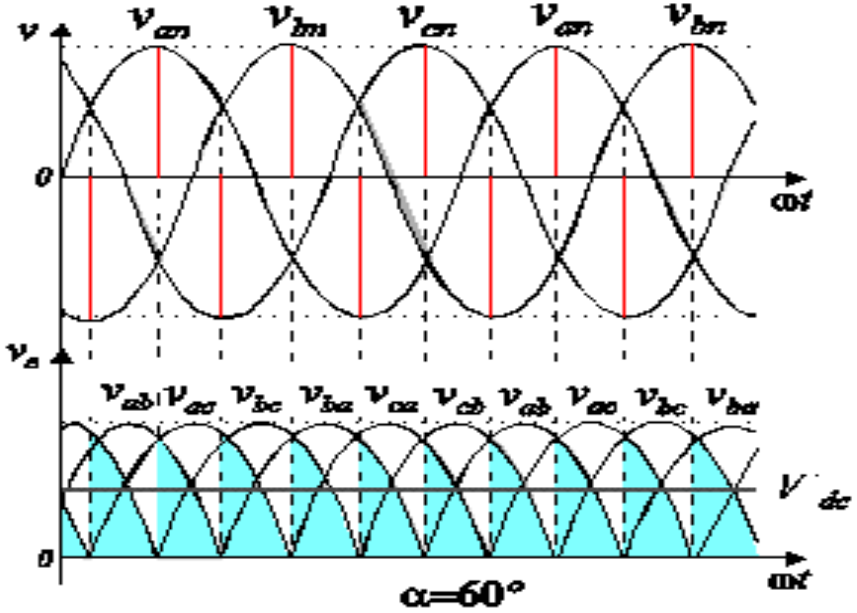


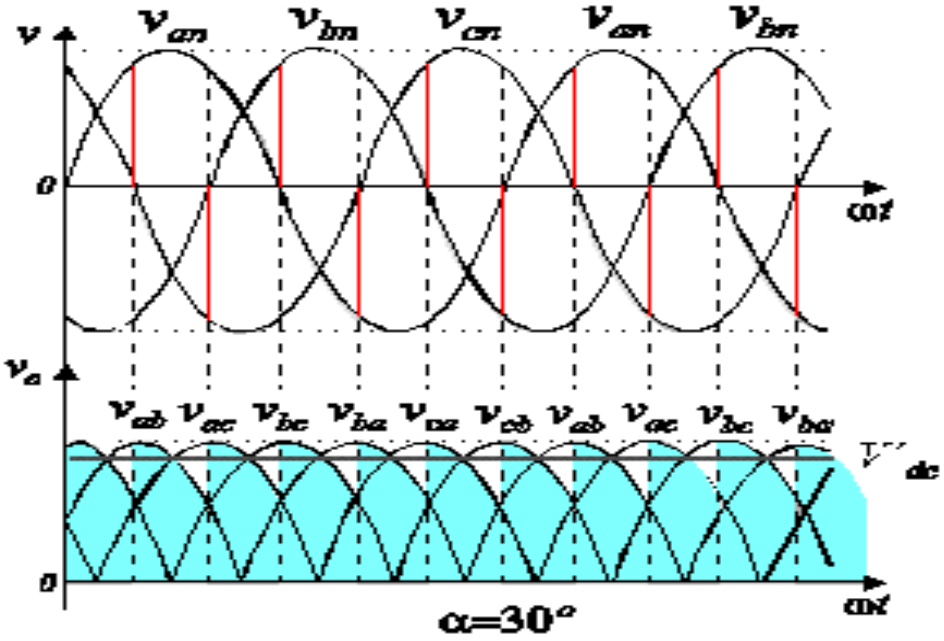


(α =30° Y CARGA RESISTIVA)

ROC totalmente controlado carga R



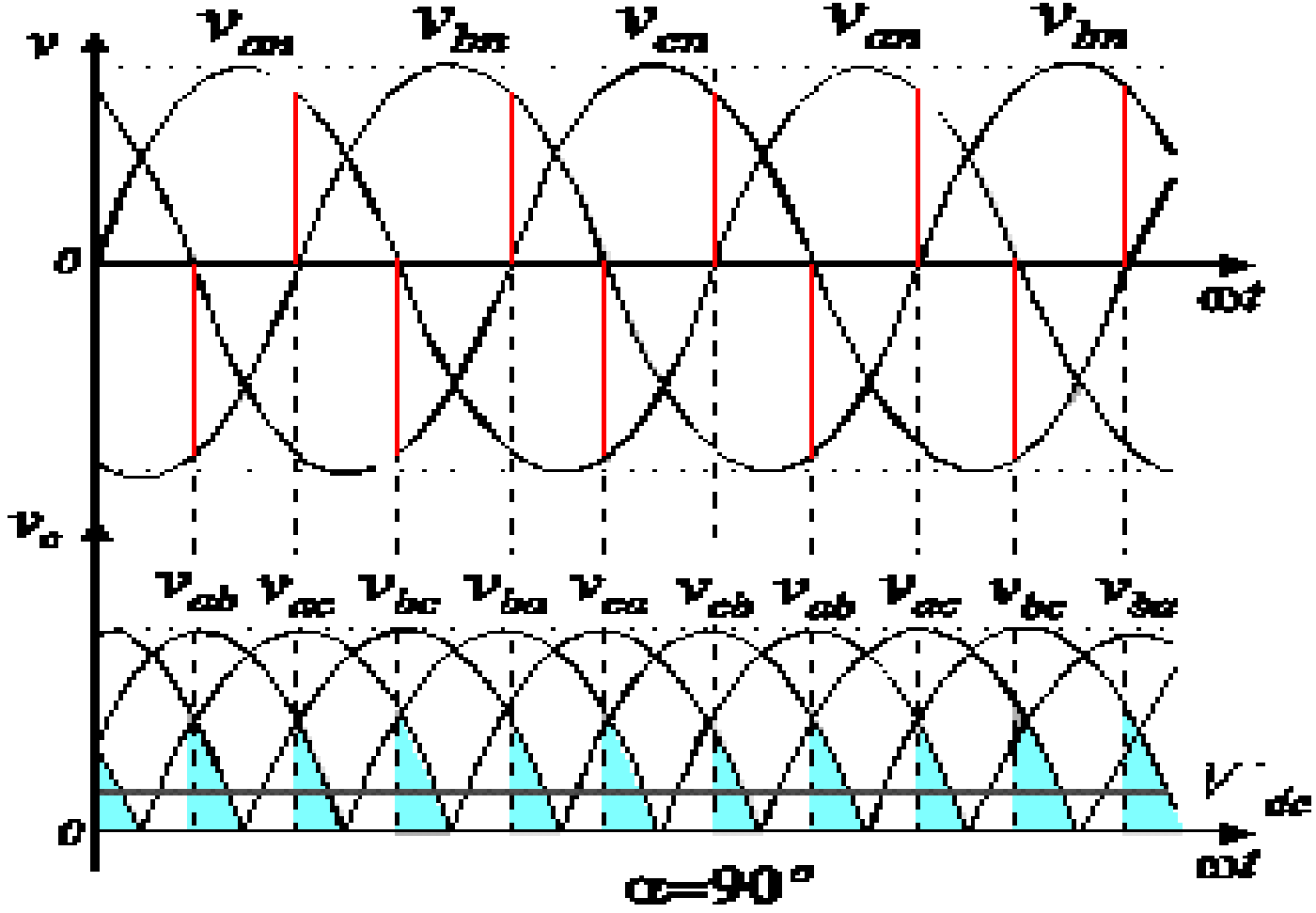




Este será el límite entre corriente continua y corriente discontinua

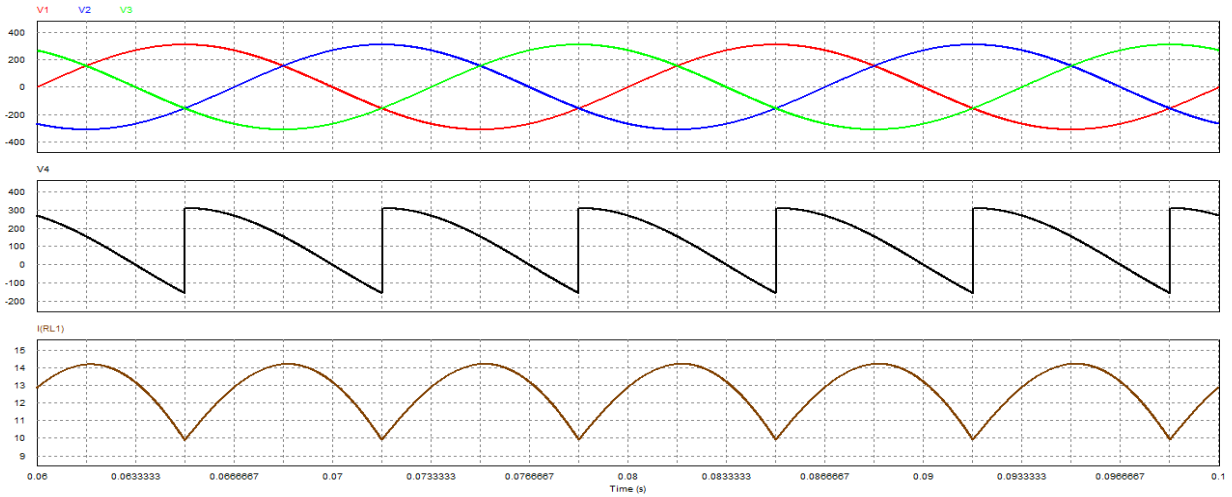
ROC totalmente controlado carga R

($\alpha > 60°$)

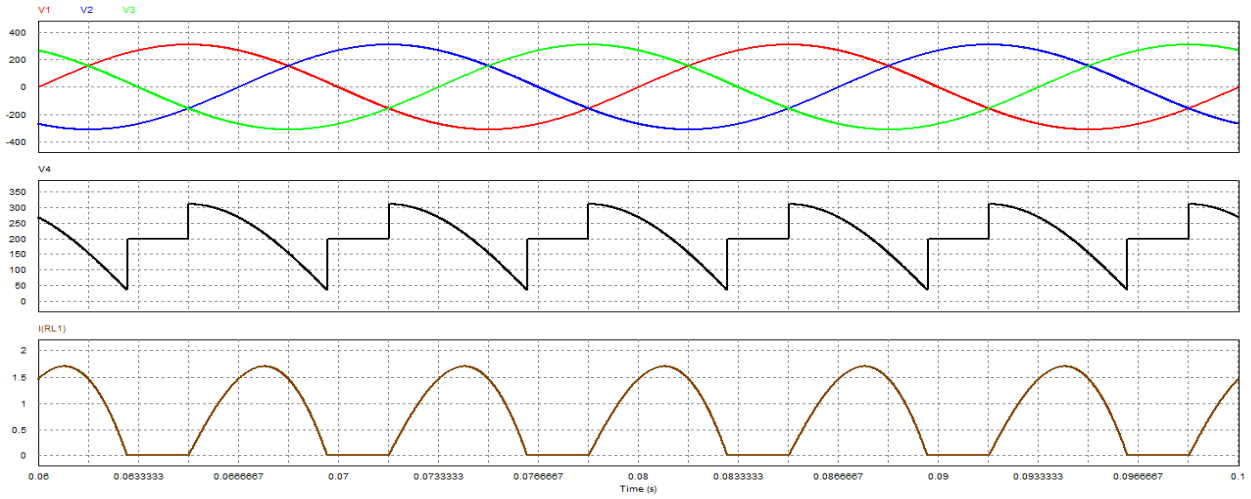


$$V'_{dc} = \frac{1}{\frac{2\pi}{6}} \int_{\frac{\pi}{6}+\alpha}^{\pi} V_{m(ab)}\, d\omega t = \frac{3}{\pi} \int_{\frac{\pi}{6}+\alpha}^{\pi} \sqrt{3} V_{\max} Sen\left(\omega t + \frac{\pi}{6}\right) d\omega t = \frac{3\sqrt{3} V_{\max}}{\pi} \left[1 + Cos\left(\frac{\pi}{3} + \alpha\right)\right]$$

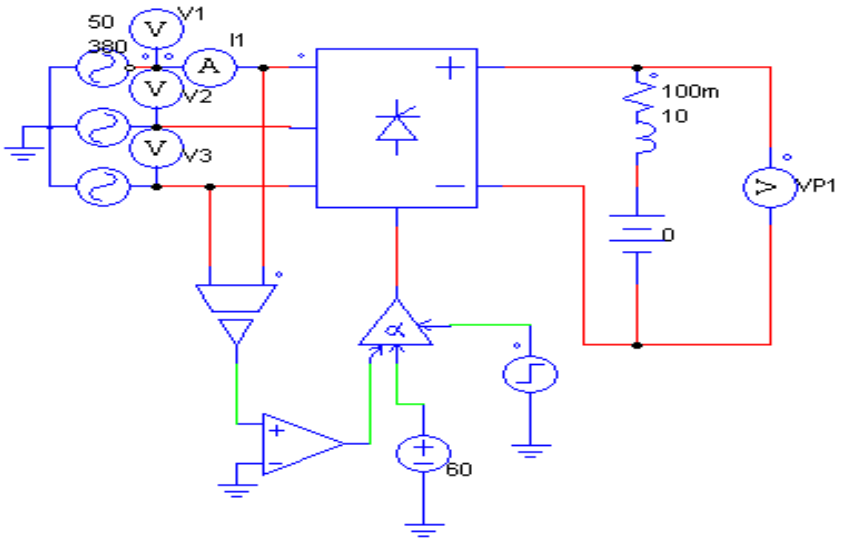
Rectificador Trifásico Controlado de Media Onda con Carga R-L y FEM



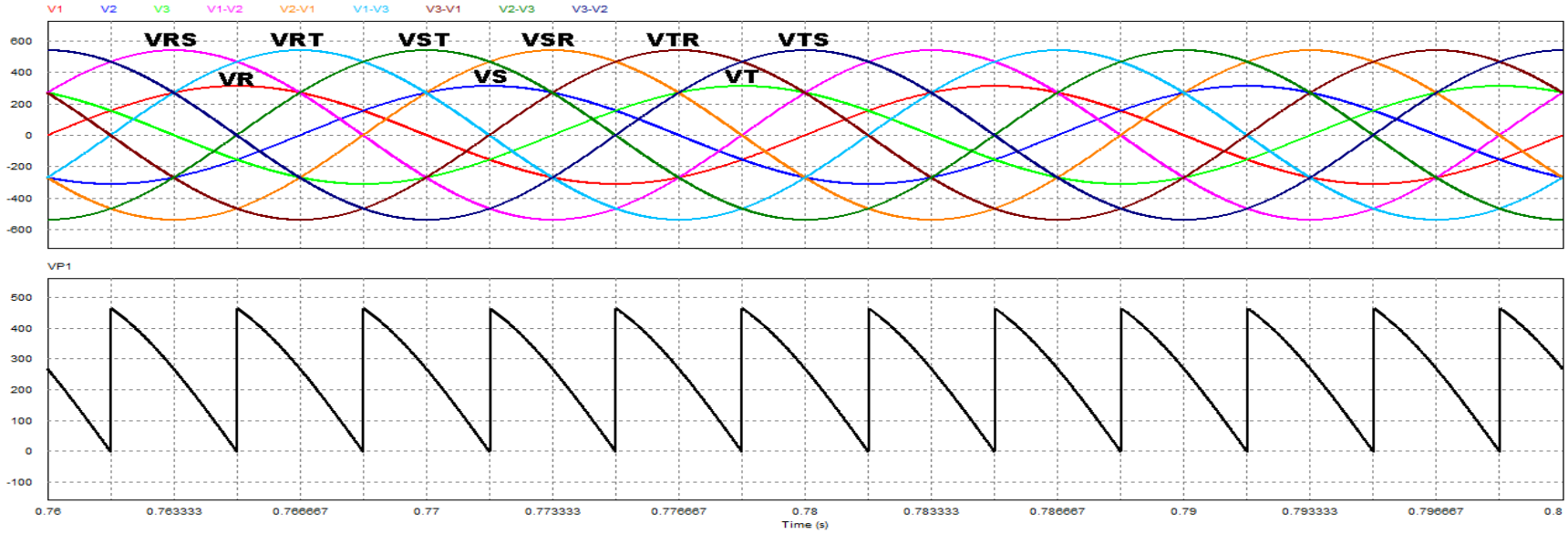
Para una fem=200v



Rectificador Trifásico Controlado de Onda Completa con Carga R-L



VP1avg= 254,49 v



Rectificador Trifásico Controlado de Onda Completa con Carga R-L