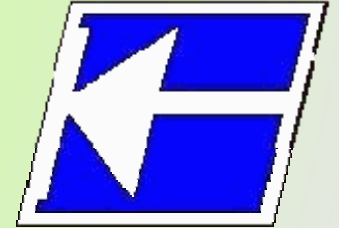


Centro Federal de Educação Tecnológica de Santa Catarina
Departamento Acadêmico de Eletrônica
Conversores Estáticos



Retificadores Monofásicos

Controlados



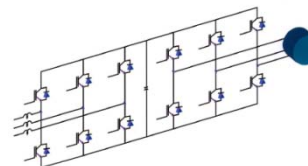
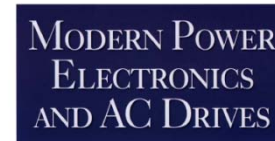
Prof. Clóvis Antônio Petry.

Florianópolis, agosto de 2008.

Bibliografia para esta aula

Capítulo 6: Retificadores monofásicos controlados

1. Retificadores monofásicos de onda completa em ponte completa, ponto médio e ponte mista.



BIMAL K. BOSE

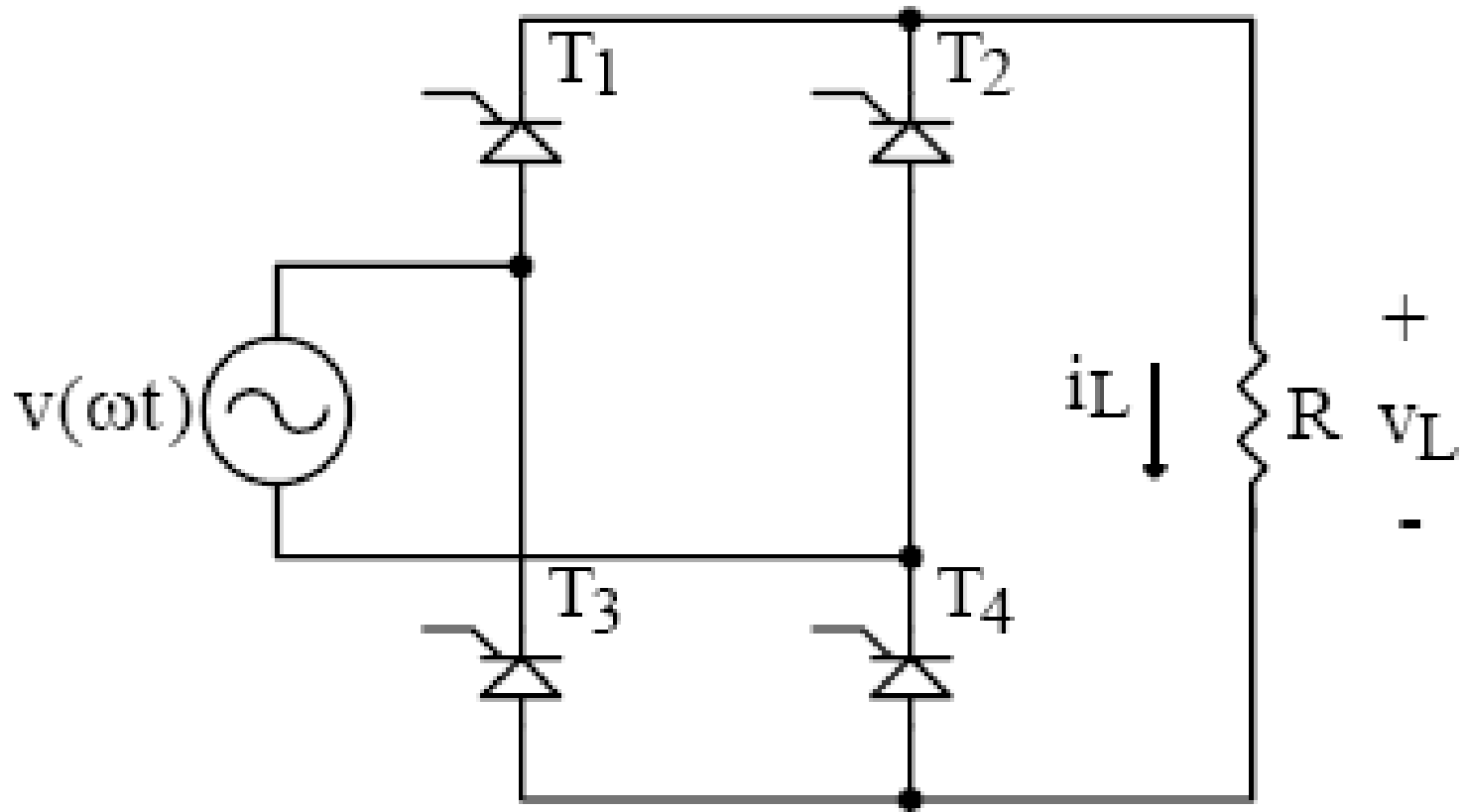
Nesta aula

Retificadores monofásicos controlados:

1. Introdução;
2. Retificadores monofásicos de onda completa:
 - Ponte completa;
 - Ponto médio;
 - Ponte mista.
3. Retificador monofásico de onda completa em ponte:
 - Carga resistiva;
 - Carga RL;
 - Fator de potência.
4. Retificador monofásico de onda completa em ponte mista:
 - Carga resistiva;
 - Carga RL;
 - Fator de potência.

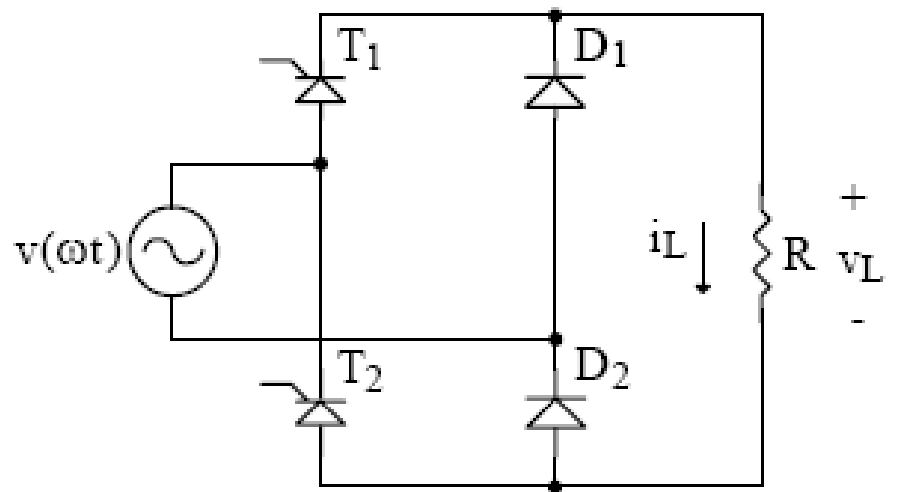
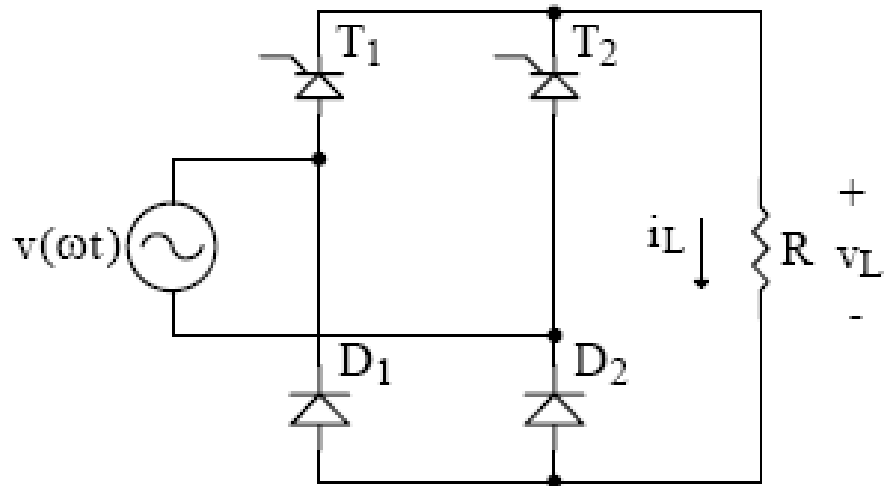
Retificador monofásico de onda completa

Ponte completa:



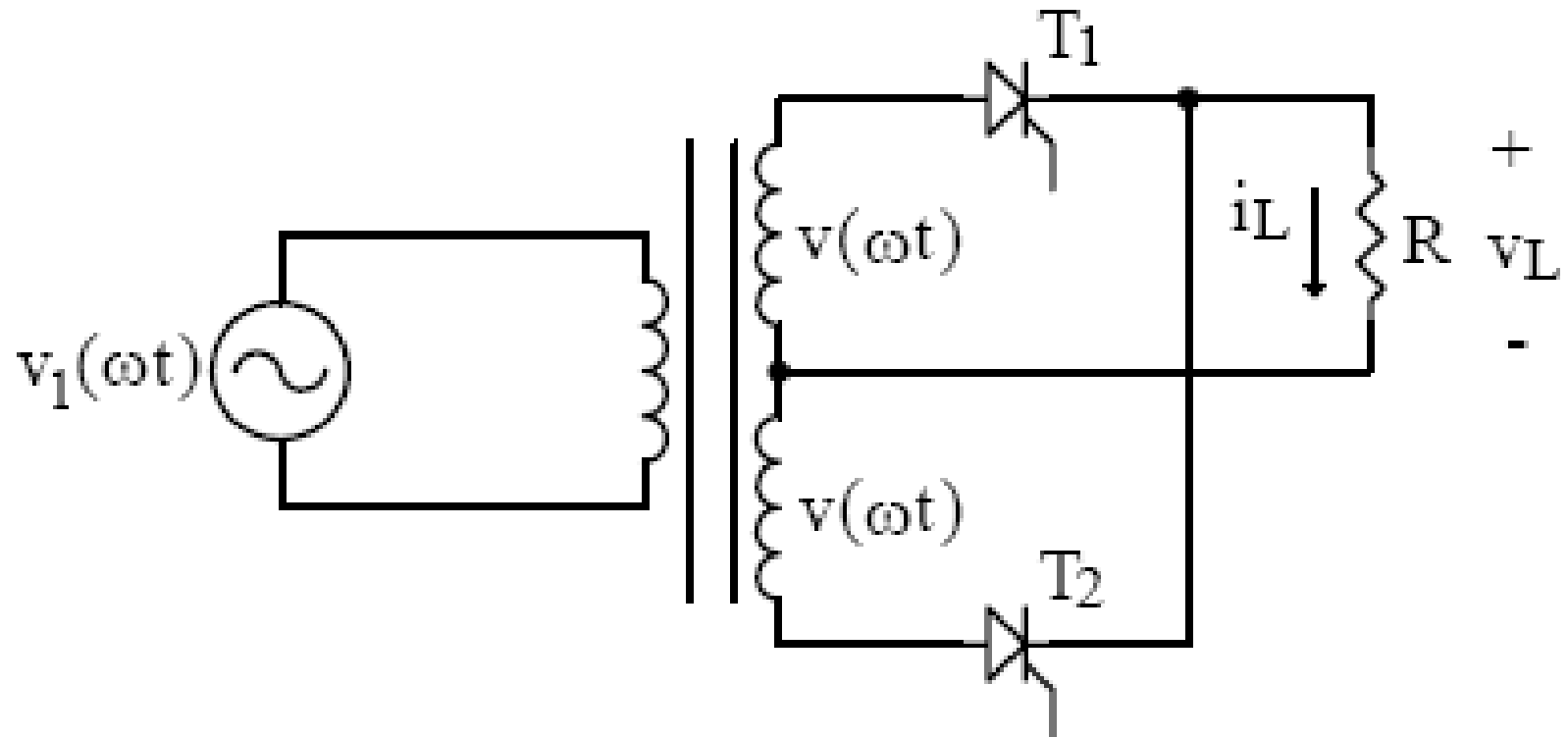
Retificador monofásico de onda completa

Ponte mista:



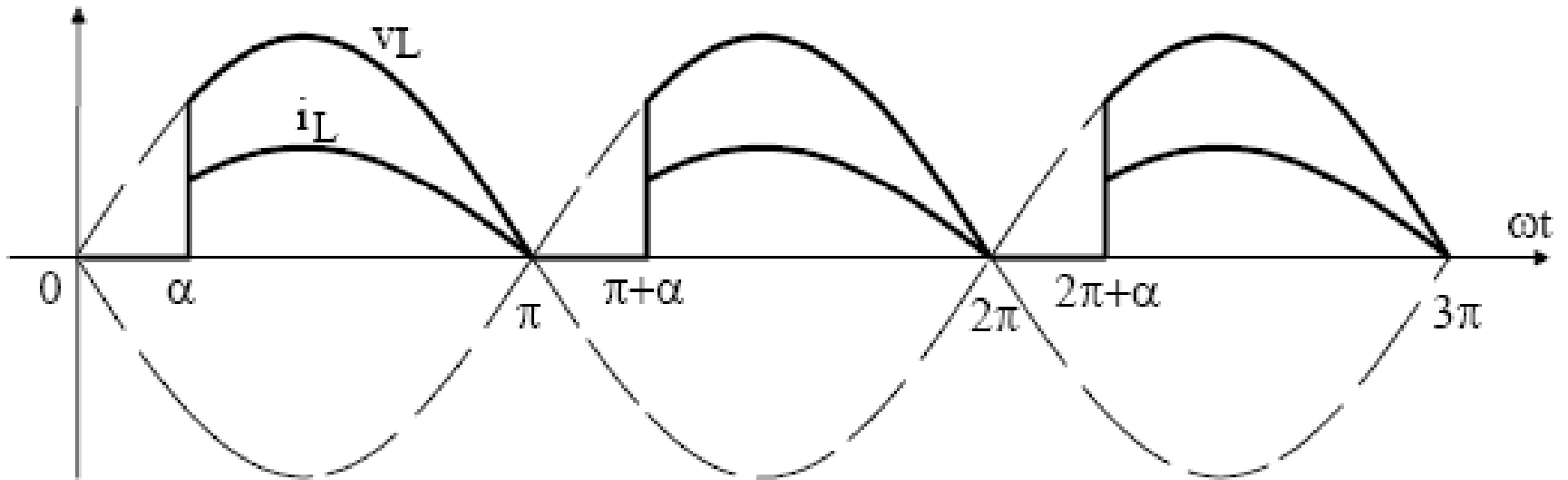
Retificador monofásico de onda completa

Ponto médio:



Retificador monofásico de onda completa

Carga resistiva pura (para todas as estruturas):



Retificador monofásico de onda completa

Carga resistiva pura (para todas as estruturas):

Tensão média na carga:

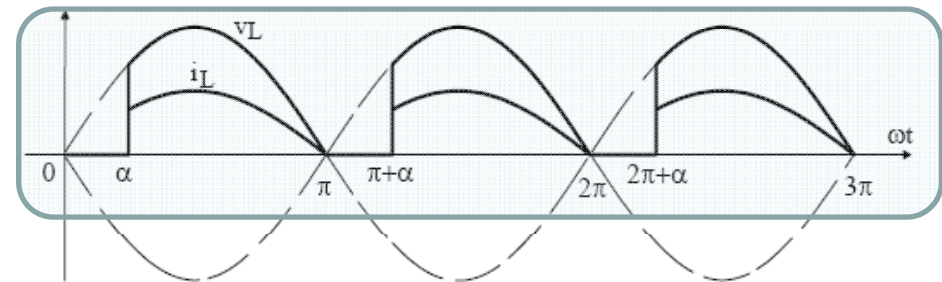
$$v(\omega t) = \sqrt{2} \cdot V_o \cdot \text{sen}(\omega t)$$

$$V_{Lmed} = \frac{1}{\pi} \int_{\alpha}^{\pi} \sqrt{2} \cdot V_o \cdot \text{sen}(\omega t) \cdot d(\omega t)$$

$$V_{Lmed} = 0,45 \cdot V_o [1 + \cos(\alpha)]$$

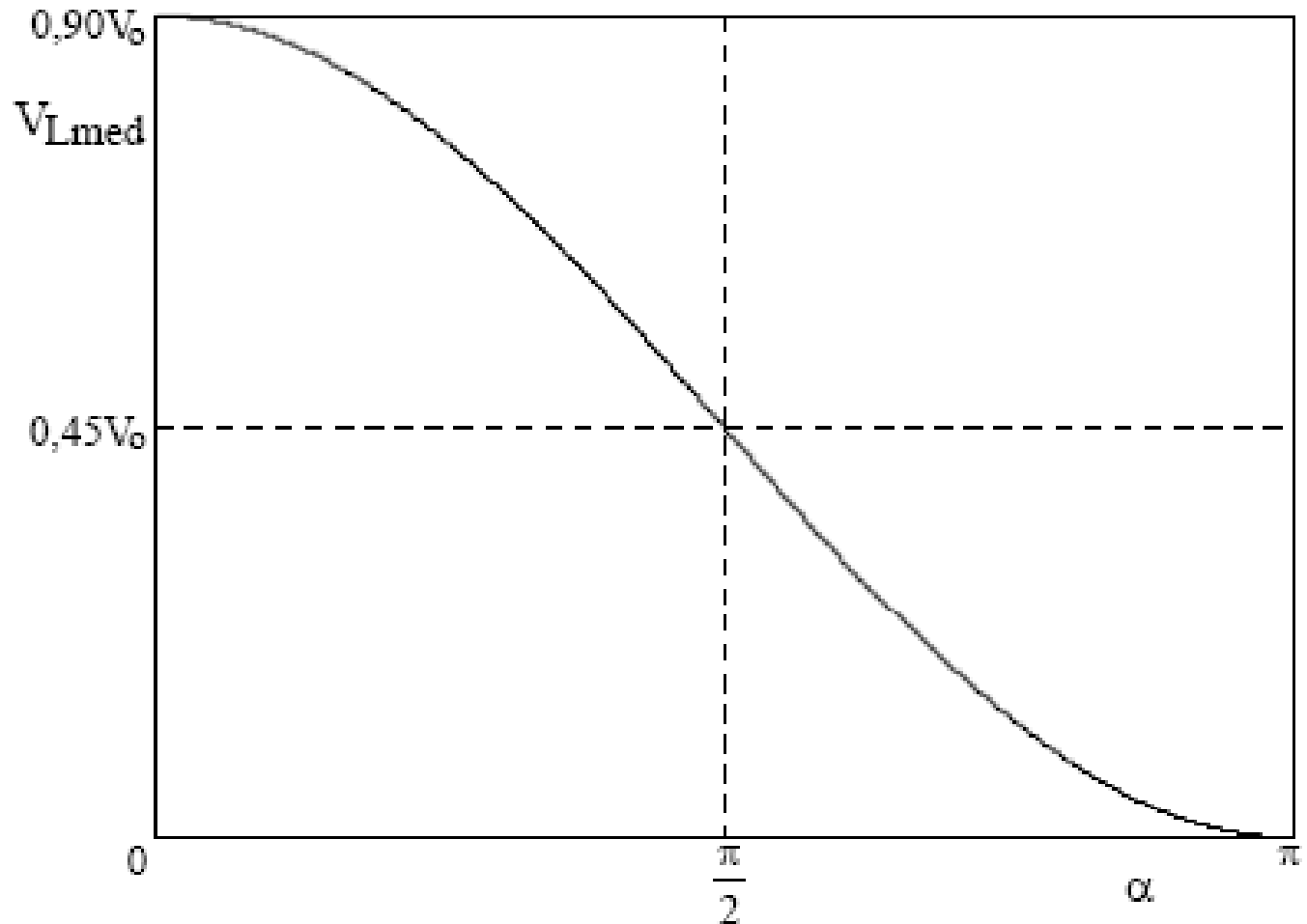
$$\circ \alpha = 0 \Rightarrow V_{Lmed} = 0,9 \cdot V_o$$

$$\circ \alpha = 180^\circ \Rightarrow V_{Lmed} = 0$$



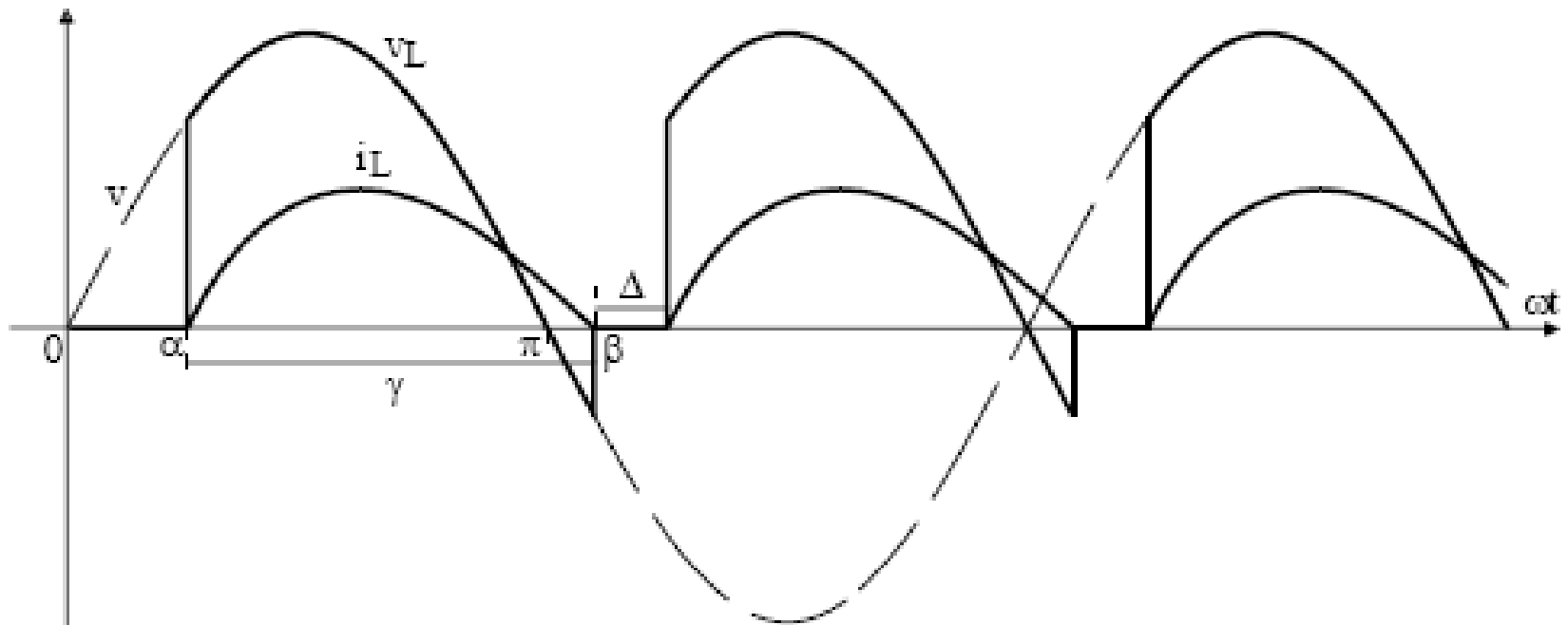
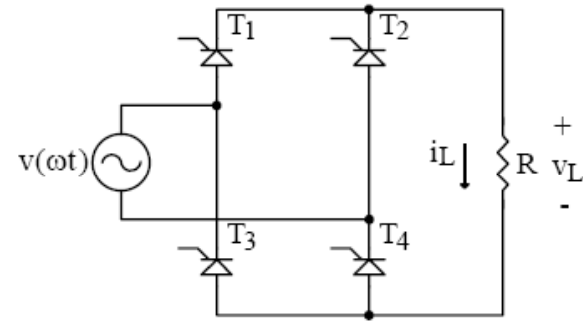
Retificador monofásico de onda completa

Carga resistiva pura (para todas as estruturas):



Retificador monofásico de onda completa

Carga RL (ponte completa):



Retificador monofásico de onda completa

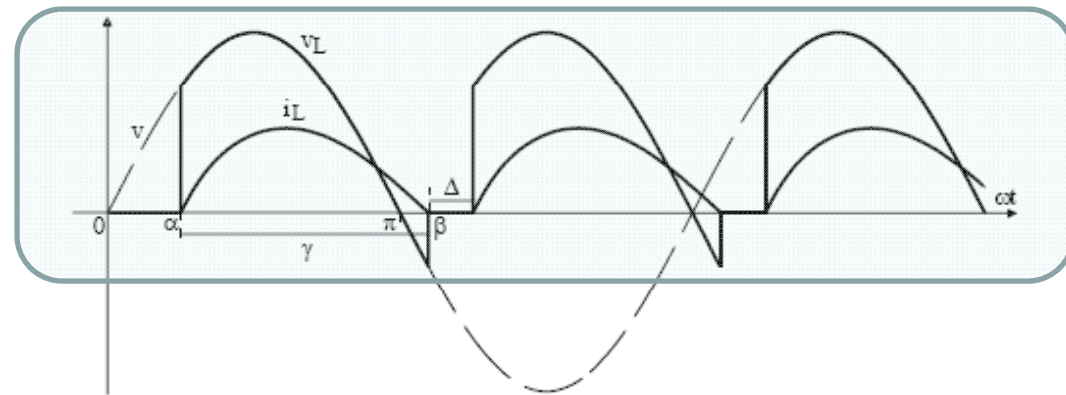
Carga RL (ponte completa):

Tensão média na carga:

$$v(\omega t) = \sqrt{2} \cdot V_o \cdot \text{sen}(\omega t)$$

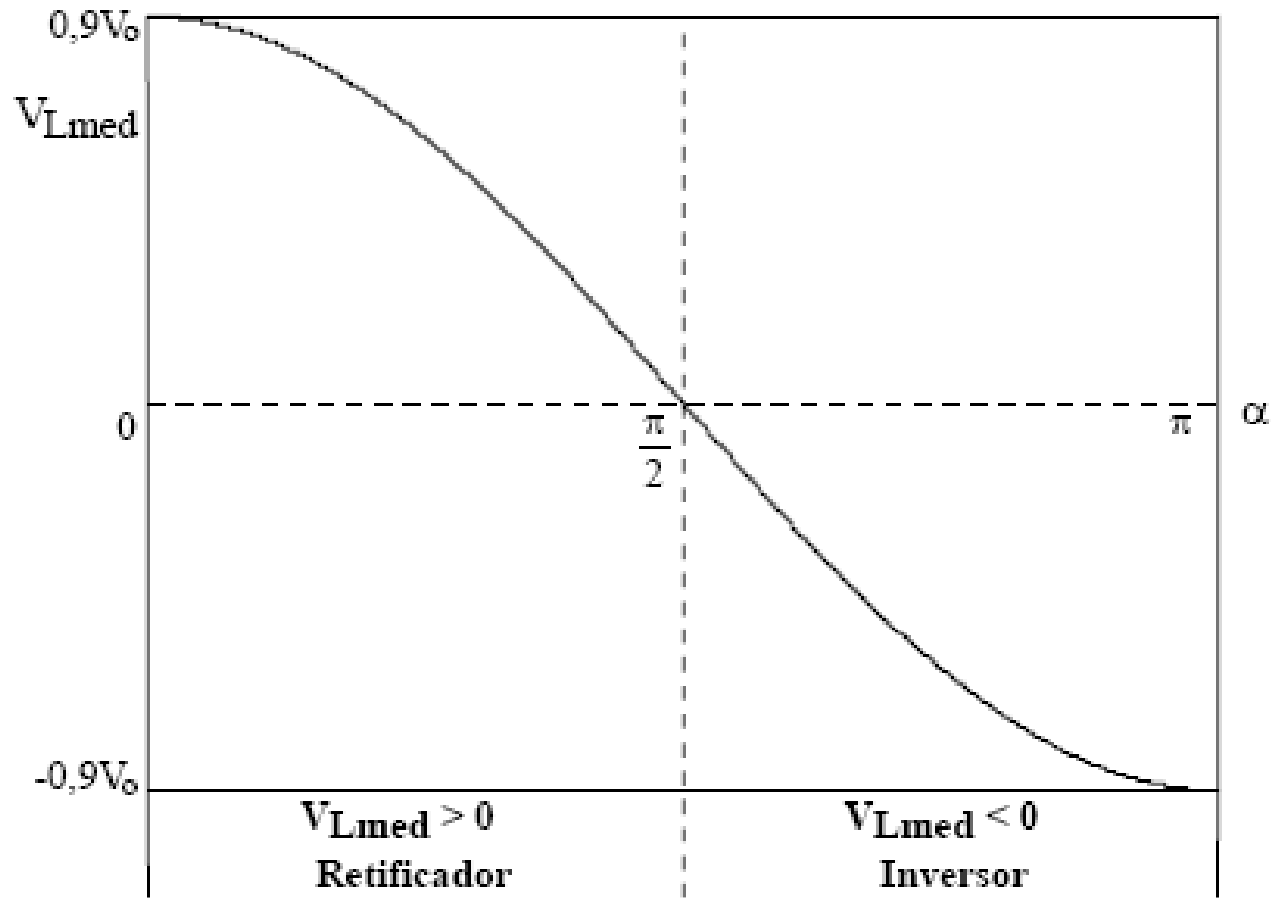
$$V_{Lmed} = \frac{1}{\pi} \int_{\alpha}^{\beta} \sqrt{2} \cdot V_o \cdot \text{sen}(\omega t) \cdot d(\omega t)$$

$$V_{Lmed} = 0,45 \cdot V_o [\cos(\alpha) - \cos(\beta)]$$



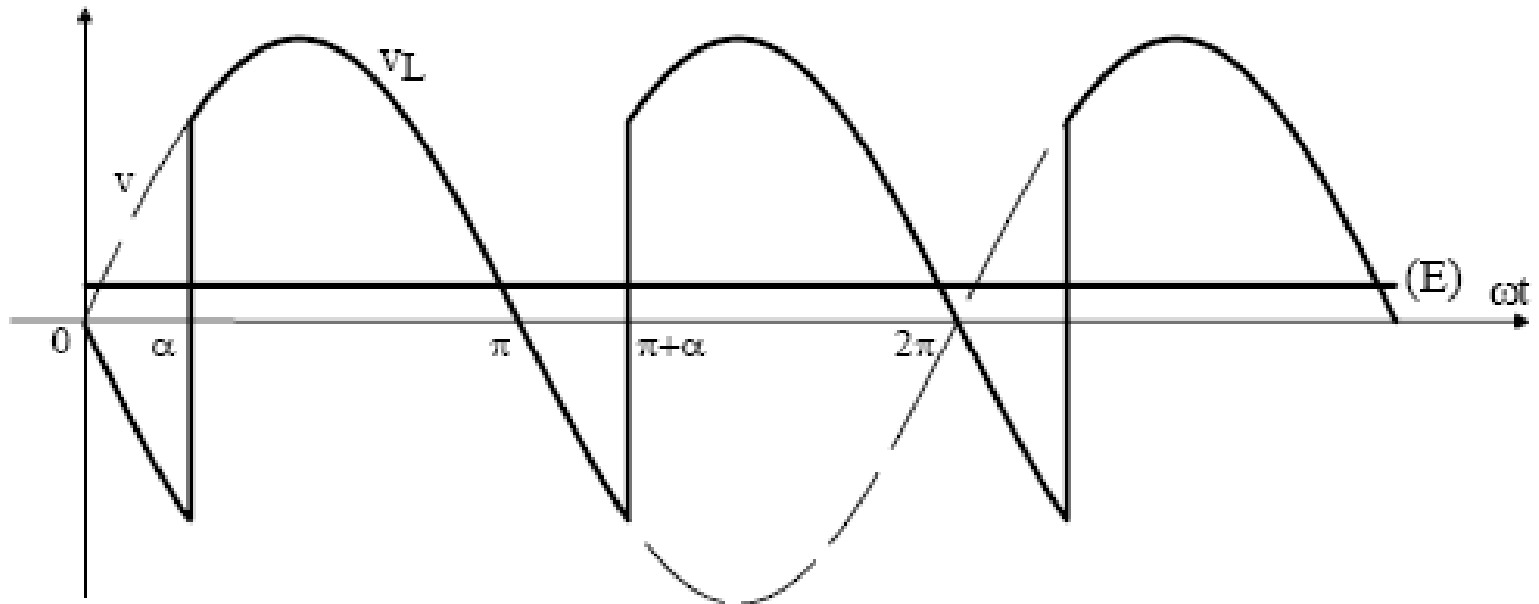
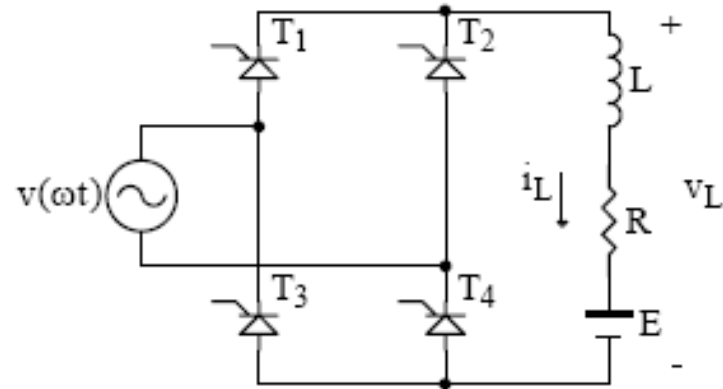
Retificador monofásico de onda completa

Carga RL (ponte completa):



Retificador monofásico de onda completa

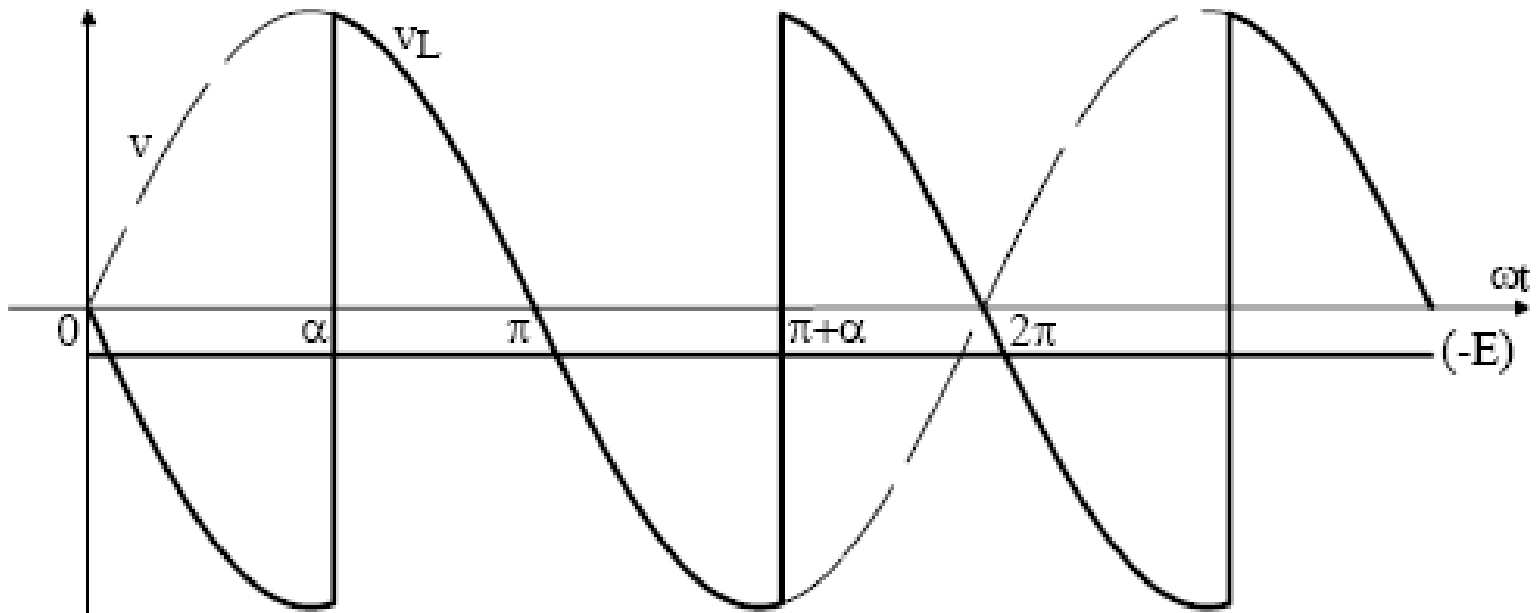
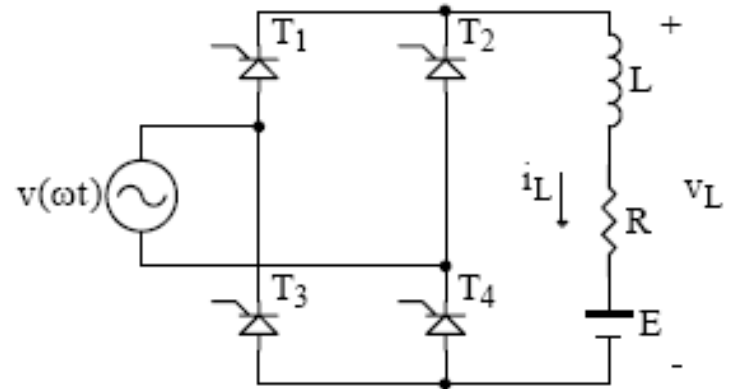
Carga RLE (ponte completa):



Retificador: $0 < \alpha < 90^\circ$

Retificador monofásico de onda completa

Carga RLE (ponte completa):



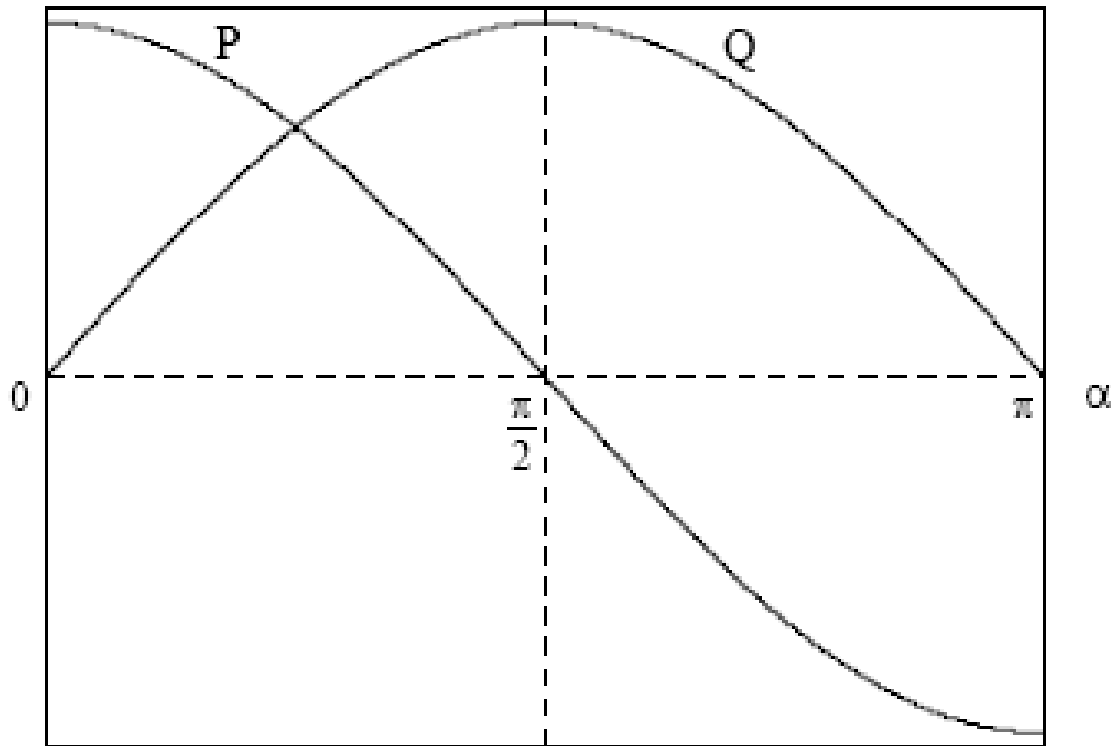
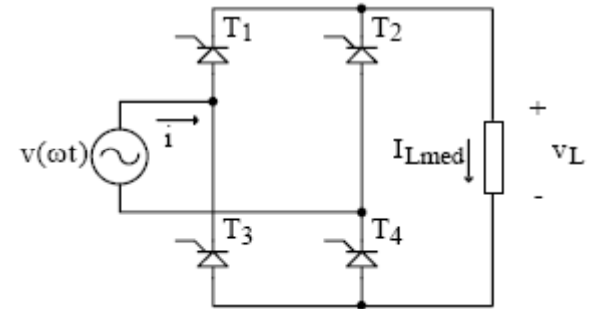
Inversor: $90^\circ < \alpha < 180^\circ$

Retificador monofásico de onda completa

Carga RLE (ponte completa):

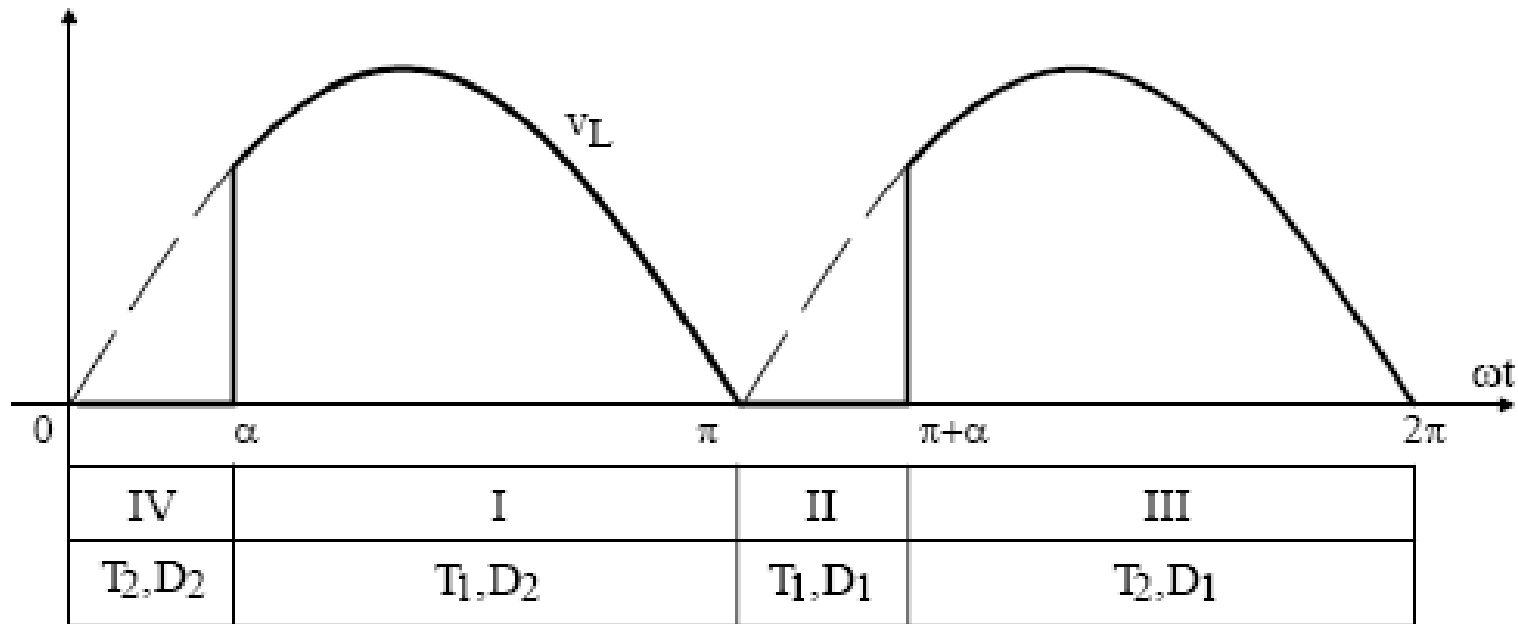
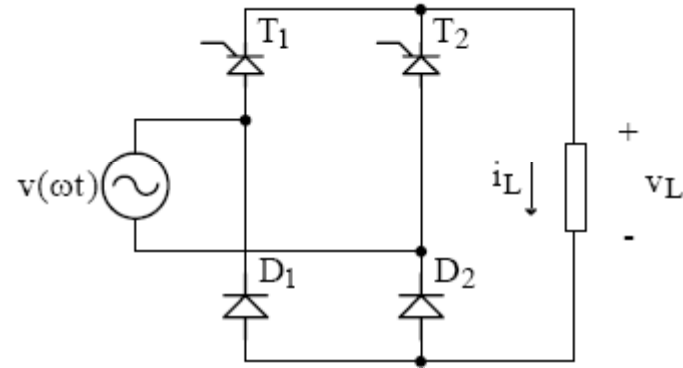
Fator de potência:

$$FP = 0,9 \cdot \cos(\alpha)$$



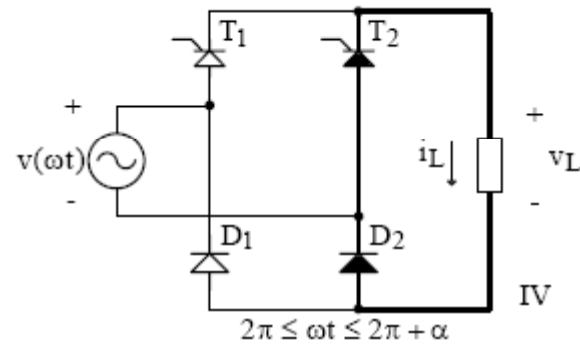
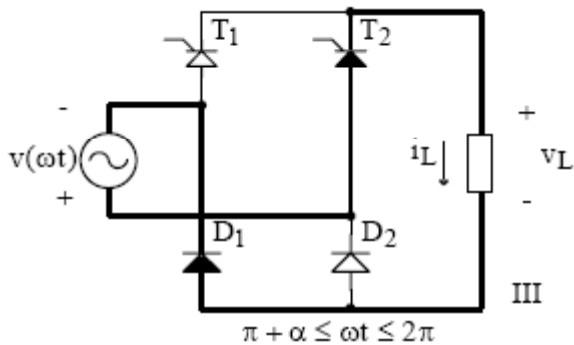
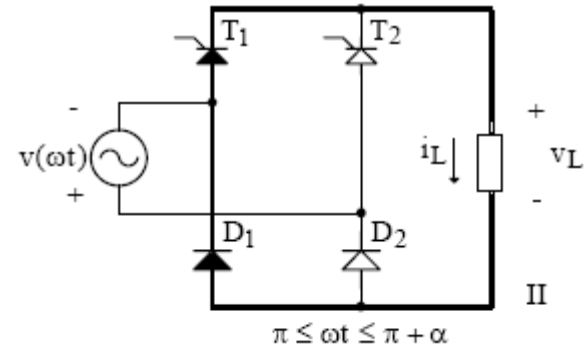
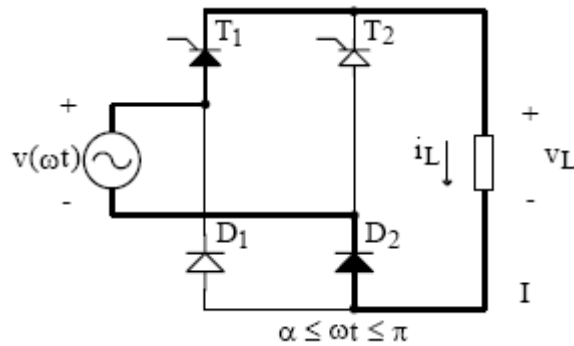
Retificador monofásico de onda completa

Carga RL (ponte mista):



Retificador monofásico de onda completa

Carga RL (ponte mista):



Retificador monofásico de onda completa

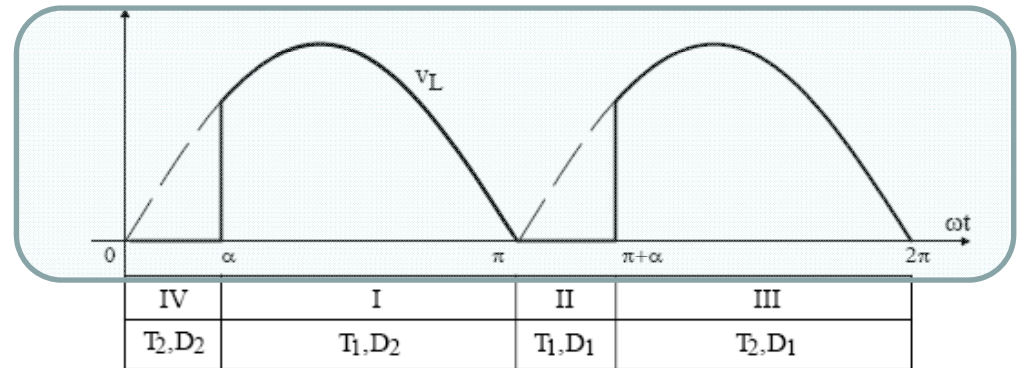
Carga RL (ponte mista):

Tensão média na carga:

$$v(\omega t) = \sqrt{2} \cdot V_o \cdot \text{sen}(\omega t)$$

$$V_{Lmed} = \frac{1}{\pi} \int_{\alpha}^{\pi} \sqrt{2} \cdot V_o \cdot \text{sen}(\omega t) \cdot d(\omega t)$$

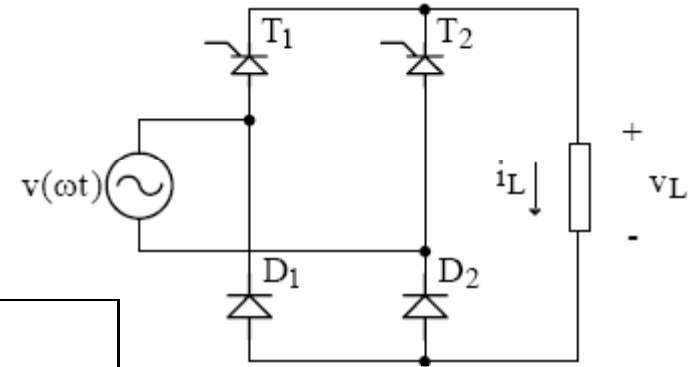
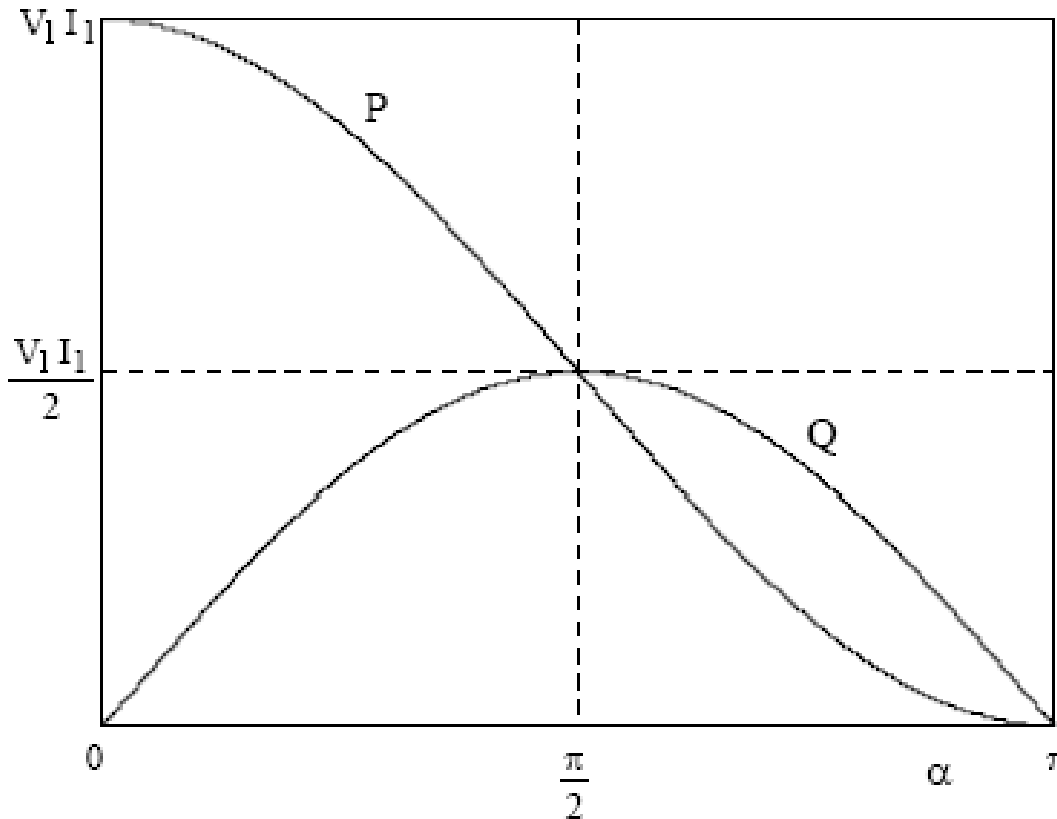
$$V_{Lmed} = 0,45 \cdot V_o [1 + \cos(\alpha)]$$



Retificador monofásico de onda completa

Carga RLE (ponte mista):

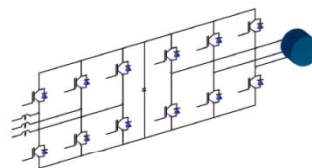
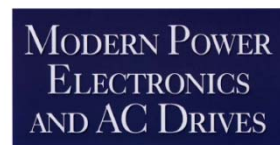
Fator de potência:



Próxima aula

Conversores CA-CC:

1. Simulação de retificadores monofásicos não-controlados e controlados.



BIMAL K. BOSE