Universidad Carlos III de Madrid

Departamento Tecnología Electrónica

Fundamentos de Ingeniería Electrónica

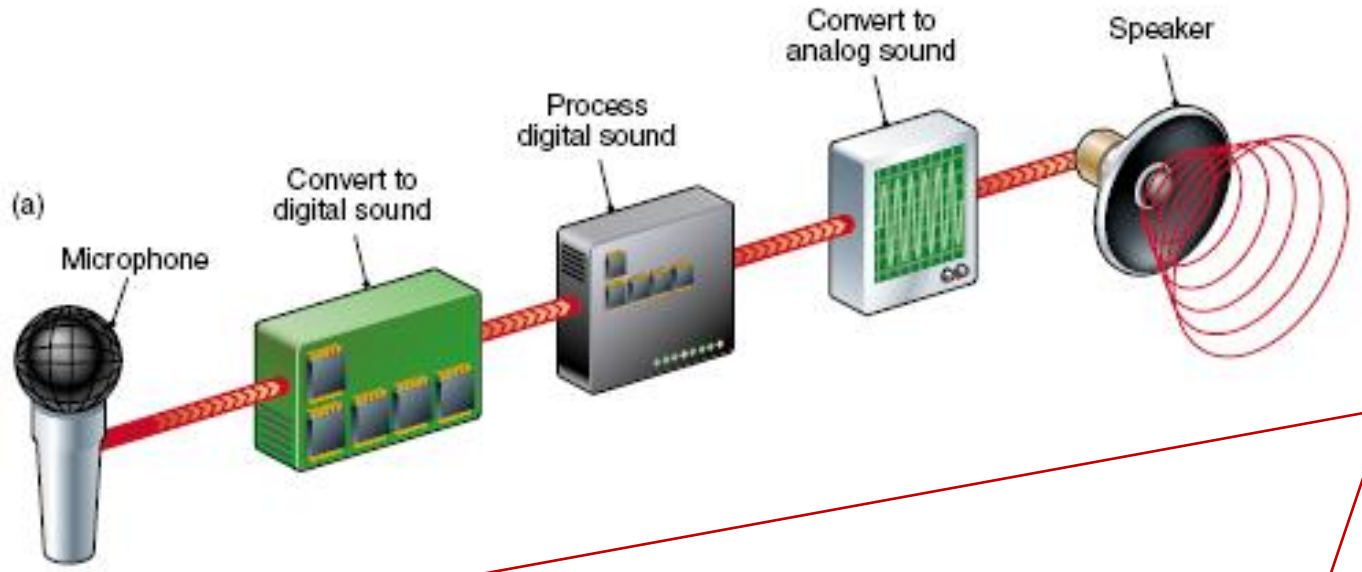
Sesión 3b:
Amplificadores (Introducción).

Amplificadores. Introducción

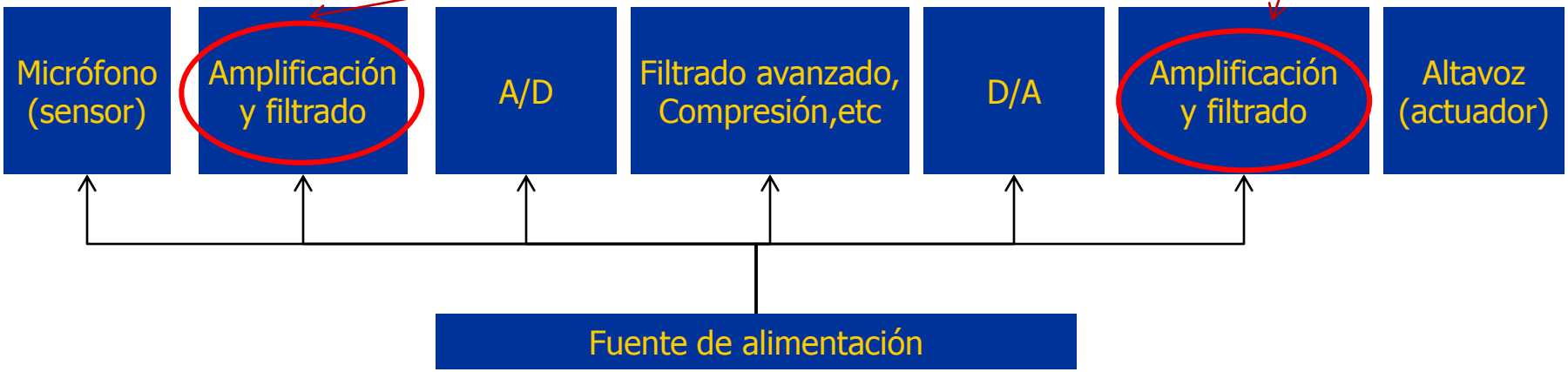
1. Concepto de amplificación.
2. Parámetros importantes de un amplificador.
3. Tipos de amplificadores.
4. Efectos de carga: cómo es un amplificador ideal y por qué.
5. Ancho de banda y condensadores de acoplo.

Amplificadores

"Enigineering: our digital future"., G. Orsak el al; Pearson Education 2004



Amplificadores



Concepto de amplificación

TECHNICAL INFORMATION SHEET:
NEMOTO NAP-50A & NAP-55A Catalytic Flammable Gas Sensors

tended to use less expensive, but less stable and less selective semiconductor type gas sensors.

The two variants of this sensor (NAP-50A and NAP-55A) are very similar in performance: The NAP50A is a slightly modified version of the original NAP55A sensor, to reduce the effect of potential cross sensitive gases likely to be encountered in domestic premises, particularly Ethanol, in compliance with the European standard for domestic gas detectors EN 50194.

The NAP-55A should therefore be used where maximum sensitivity to all flammable gases is required, whereas the NAP-50A should be selected if high sensitivity to natural gas or LPG only is required, and the lowest cross sensitivity to other flammable gases and vapours is desirable.

Features:

- Low cost design for Domestic Gas Detectors
- Linear output to 50%LEL (Natural Gas)
- Small size
- Long life

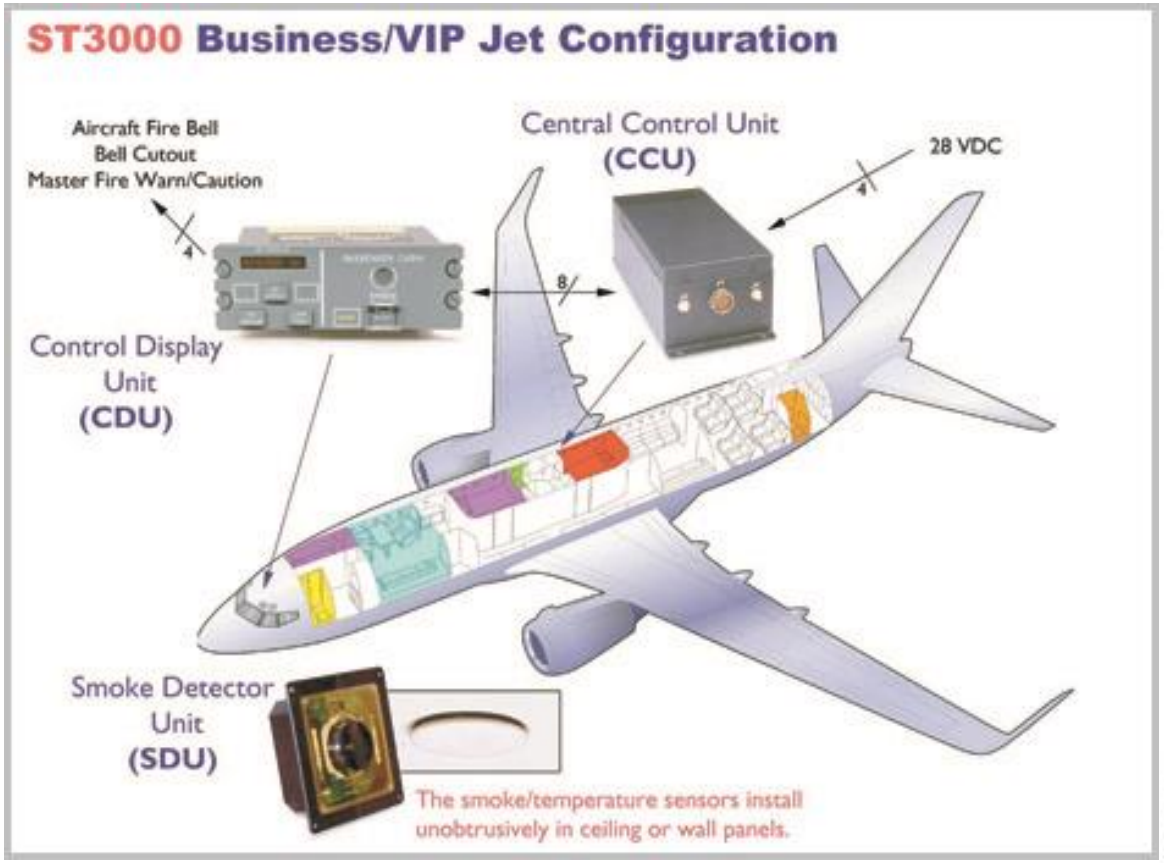
General Description:

The Nemoto NAP-50A and NAP55A are catalytic

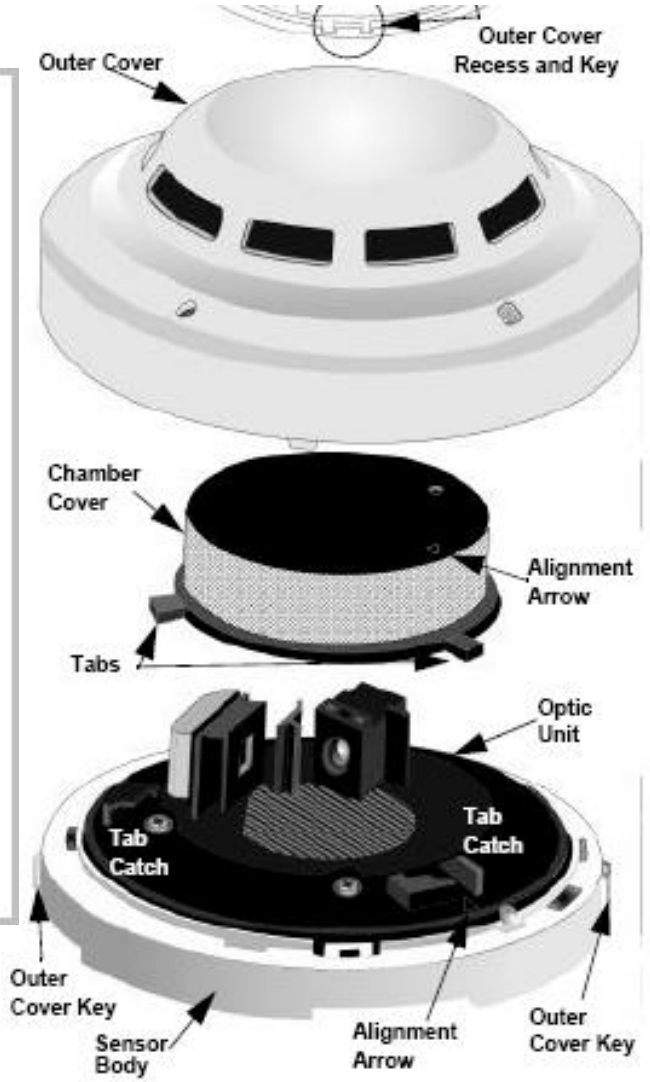
Specifications: (applies to both variants)

Recommended Voltage:	2.6V +/- 0.25V
Current Drawn:	170 +/- 10mA
Zero Offset:	0mV +/- 35mV
Output Sensitivity:	12-16mV @3000ppm CH_4
Range:	0-50% LEL
Repeatability:	+/- 0.5mV CH_4
Maximum Long Term Drift:	
Expected Lifetime in the field:	>5 years*

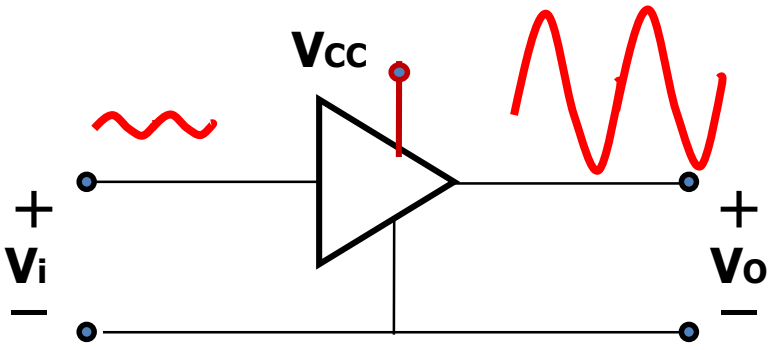
Concepto de amplificación

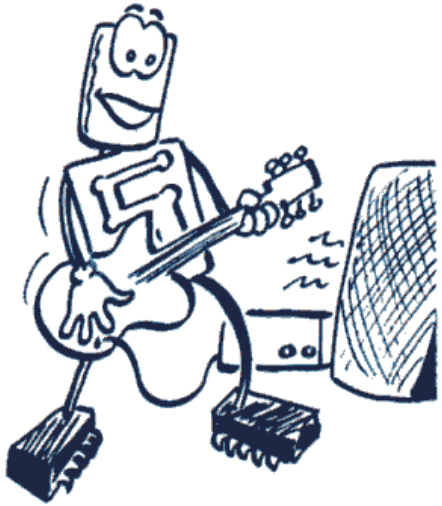


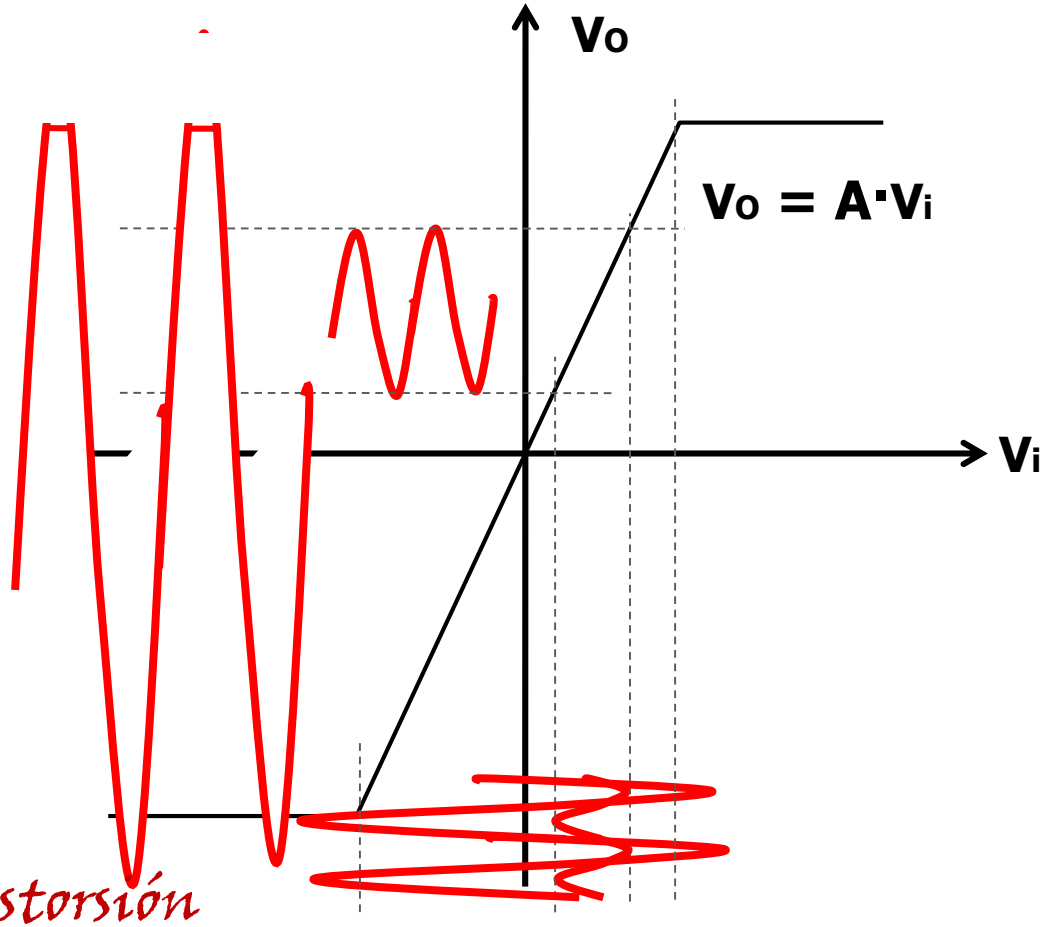
Aviation International News



Concepto de amplificación



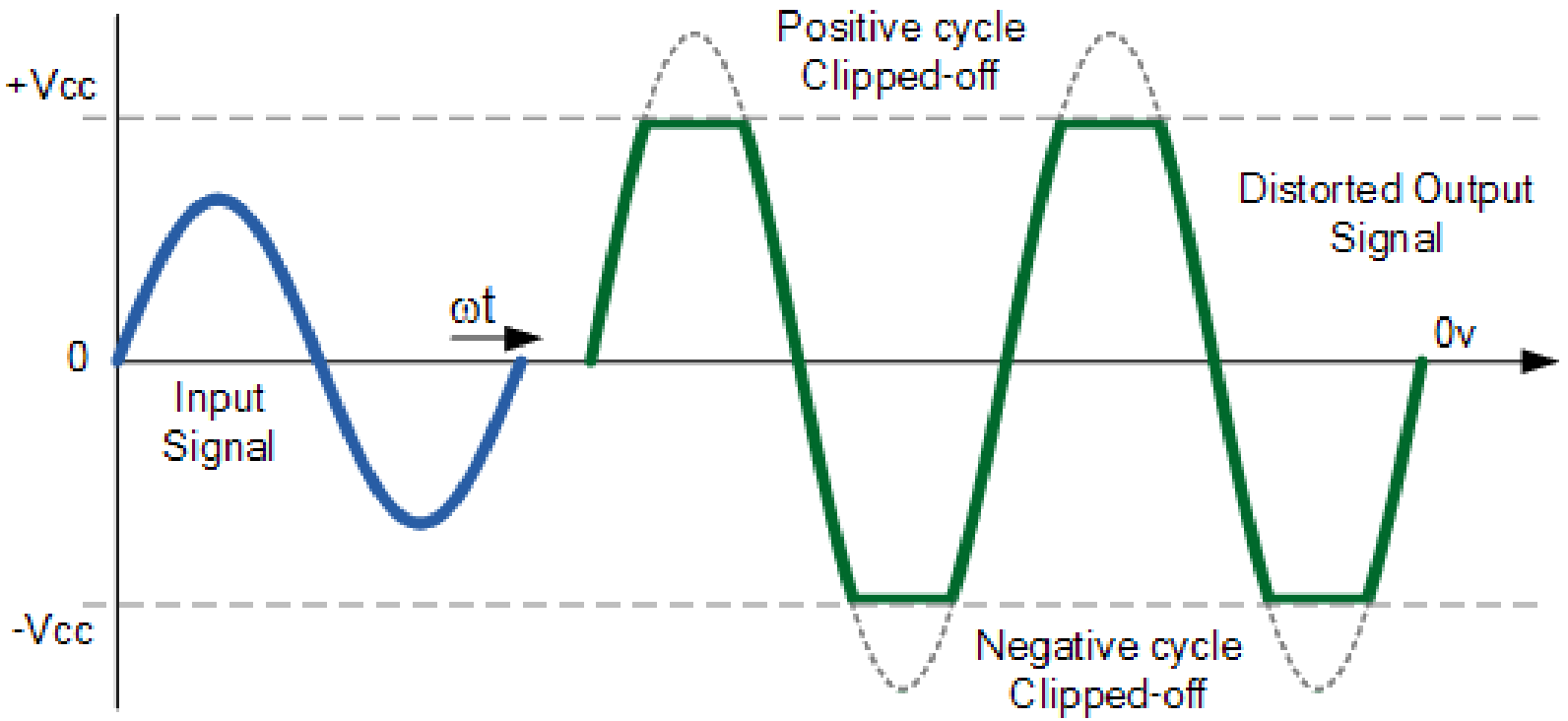




- **Alimentación**
- **Linealidad**
- **Saturación**

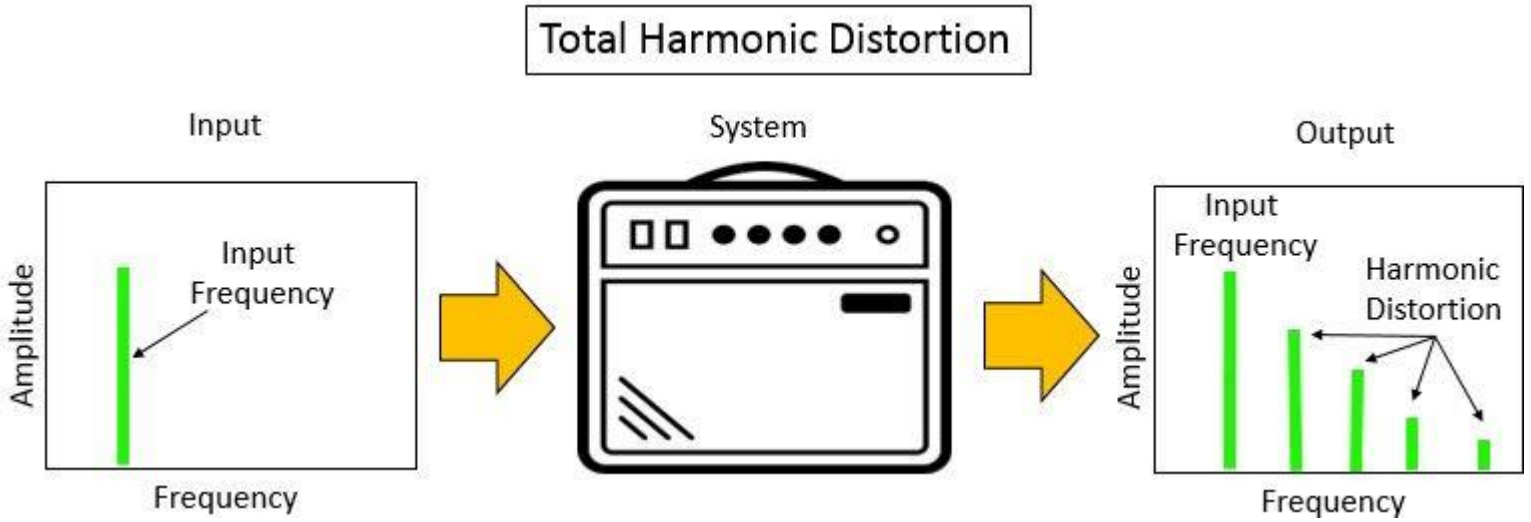
Distorsión

Parámetros de amplificación



Electronics tutorials

Concepto de amplificación



Siemens PLM Community

Probad en

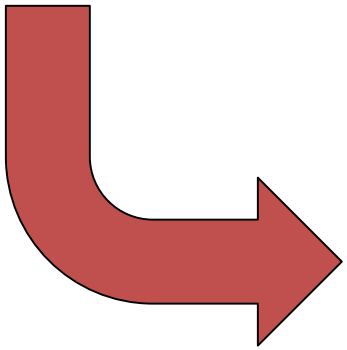
http://onlinetonegenerator.com/432Hz.html

http://www.szynalski.com/tone-generator/

Parámetros de amplificación

GANANCIA

$$A_{Potencia} = 10 \log_{10} \frac{P_{salida}}{P_{entrada}}$$

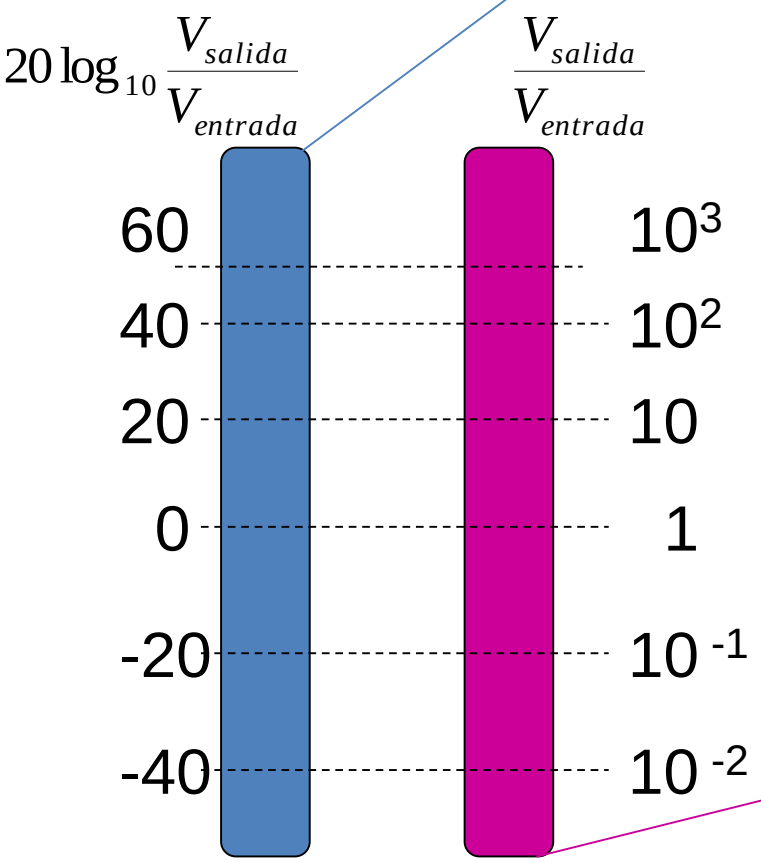


$$A_V = 20 \log_{10} \frac{V_{salida}}{V_{entrada}}$$

Parámetros de amplificación

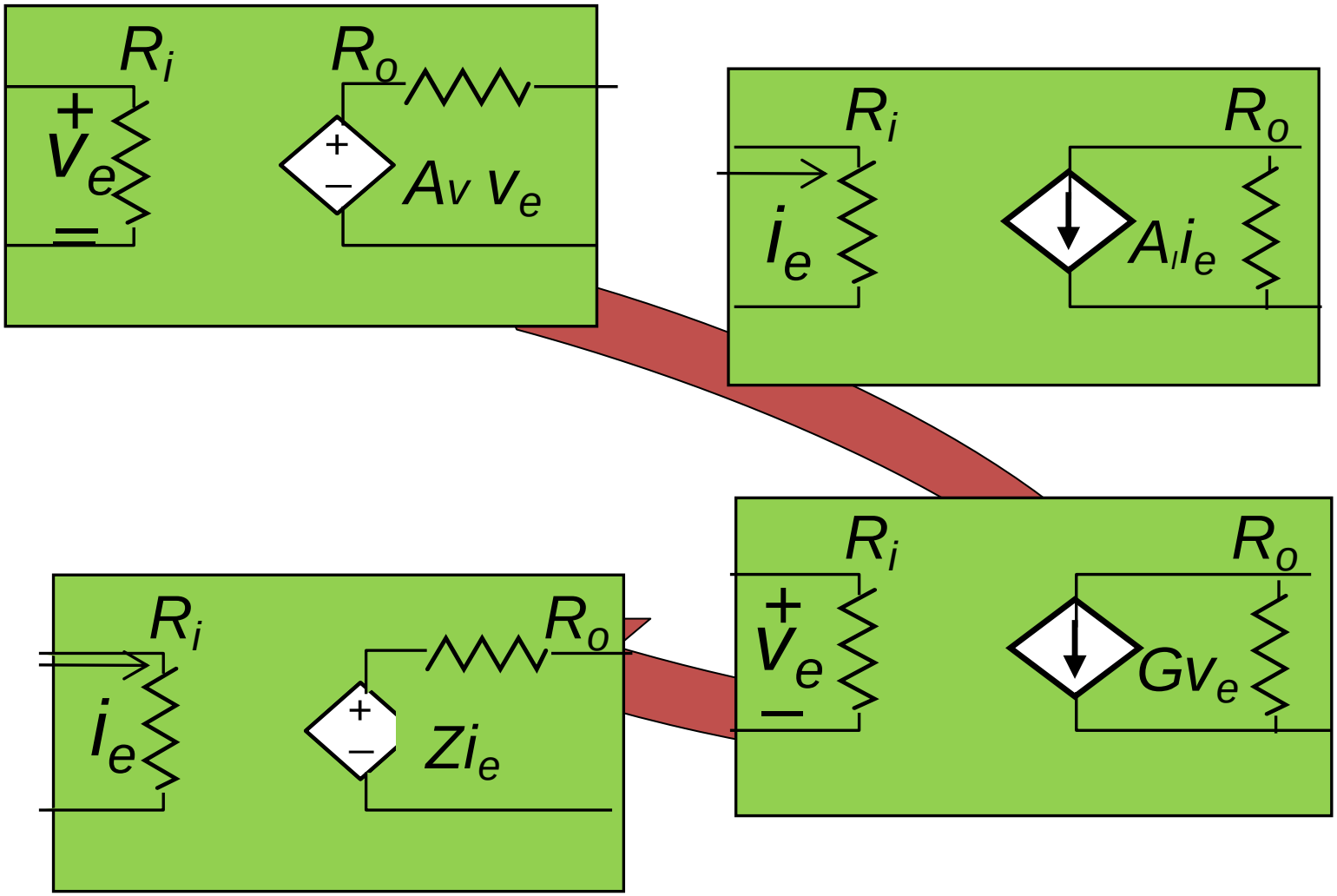
GANANCIA

Ganancia (A) = $A_1 * A_2 * A_3 * A_4 * \ldots * A_n$.

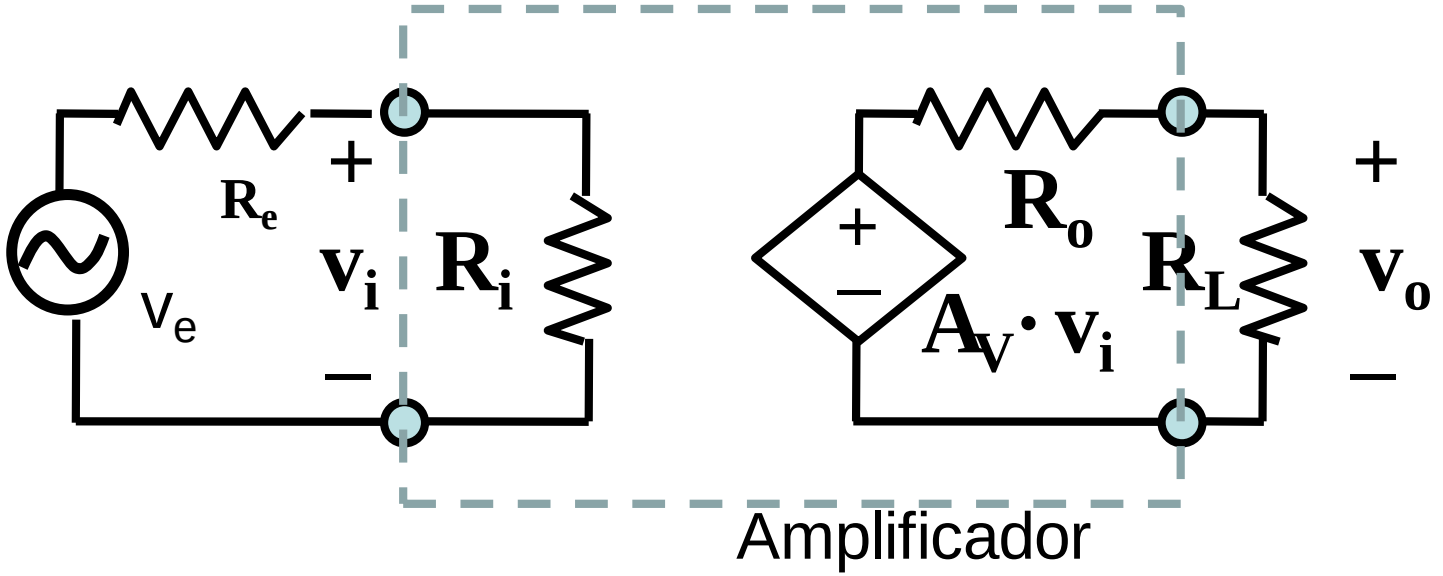


Ganancia en dB (A) = $A_1 + A_2 + A_3 + A_4 + \ldots A_n$

Los tipos de amplificación

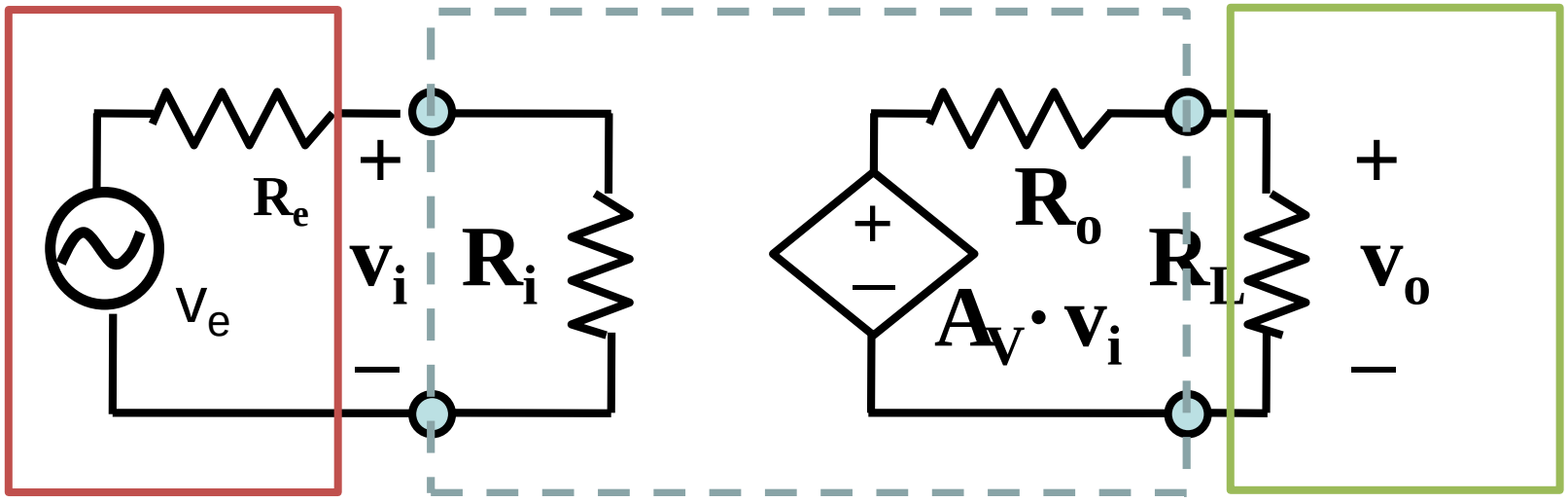


Los tipos de amplificación



$$A_{Vtotal} = \frac{v_o}{v_e} = \frac{v_o}{v_i} \cdot \frac{v_i}{v_e} = \frac{R_L}{R_O + R_L} \cdot A_V \cdot \frac{R_i}{R_e + R_i}$$

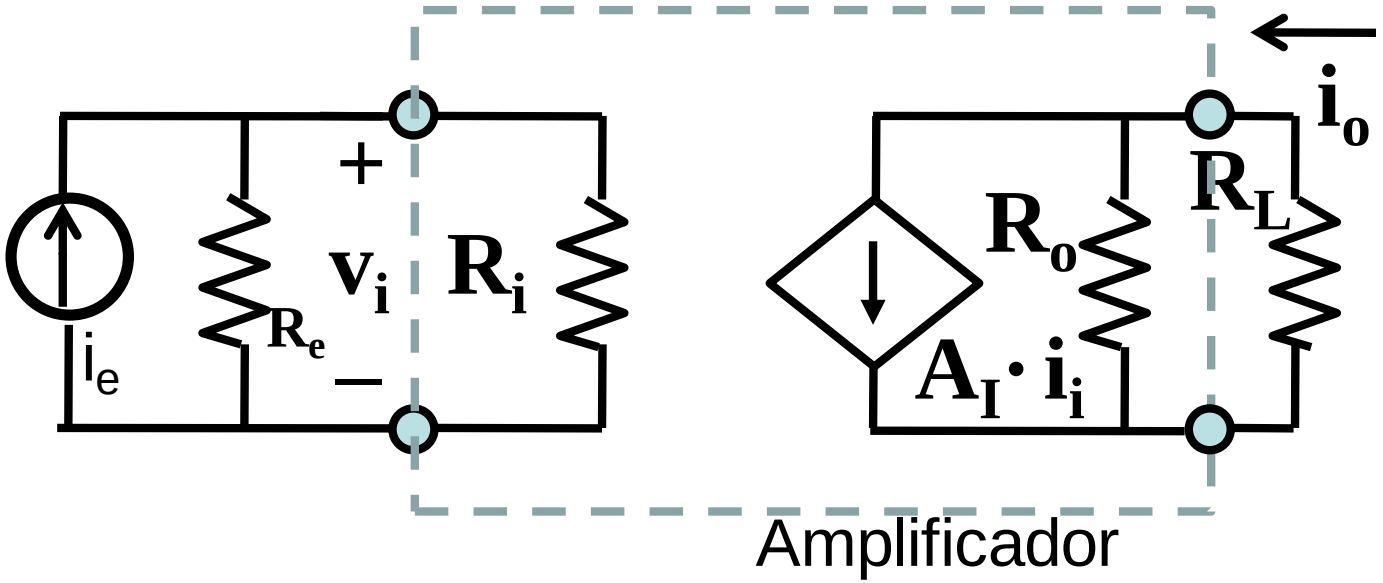
Efecto de carga por conexión del amplificador



Generador de señal | **Amplificador de tensión** | **Carga**

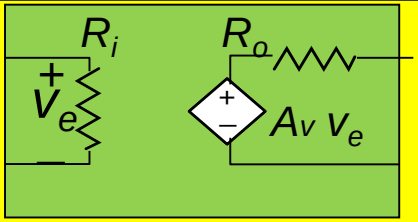
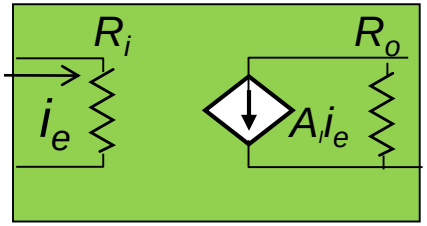
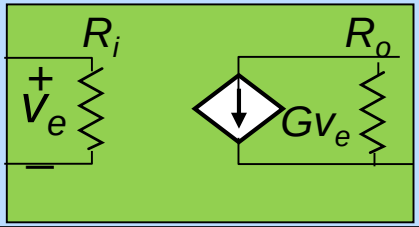
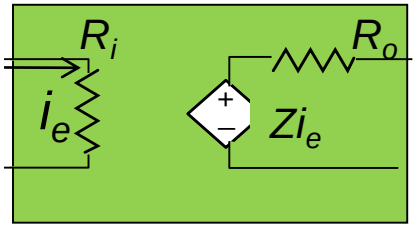
$$A_{Vtotal} = \frac{v_o}{v_e} = \frac{v_o}{v_i} \cdot \frac{v_i}{v_e} = \frac{R_L}{R_O + R_L} \cdot A_V \cdot \frac{R_i}{R_e + R_i} < A_V$$

Los tipos de amplificación



$$A_{Itotal} = \frac{i_o}{i_e} = \frac{i_o}{i_i} \cdot \frac{i_i}{i_e} = \frac{R_o}{R_o + R_L} \cdot A_I \cdot \frac{R_e}{R_i + R_e}$$

Los tipos de amplificación

	Entra	Sale	Ganancia (unidades)	R_i	R_o	Modelo
Tensión	V	V	A_V=V/V			
Corriente	I	I	A_I=A/A			
Trans conductancia	V	I	G=A/V			
Trans impedancia	I	V	Z=V/A			

El efecto de los condensadores de acoplo: la función de transferencia de cualquier amplificador

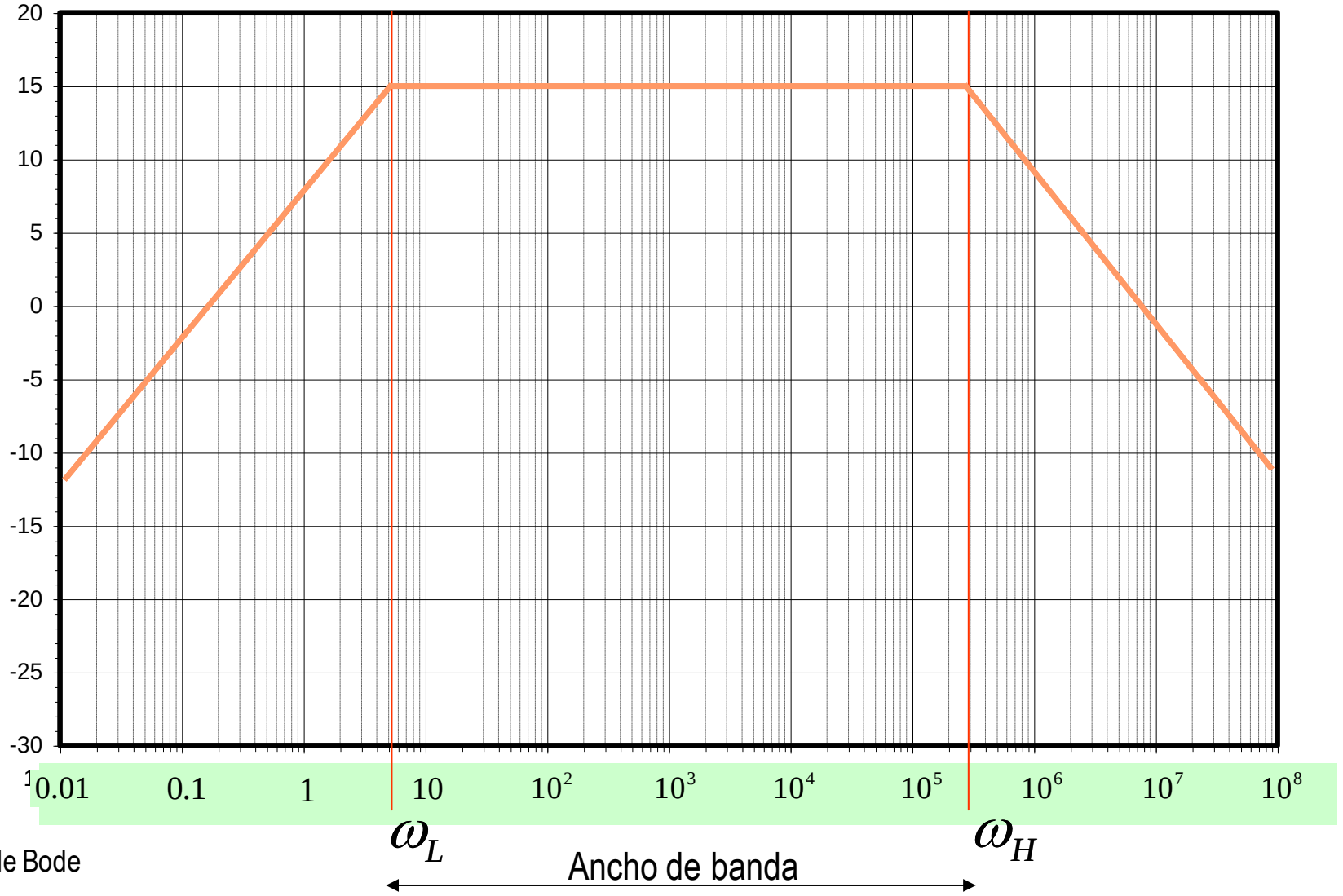
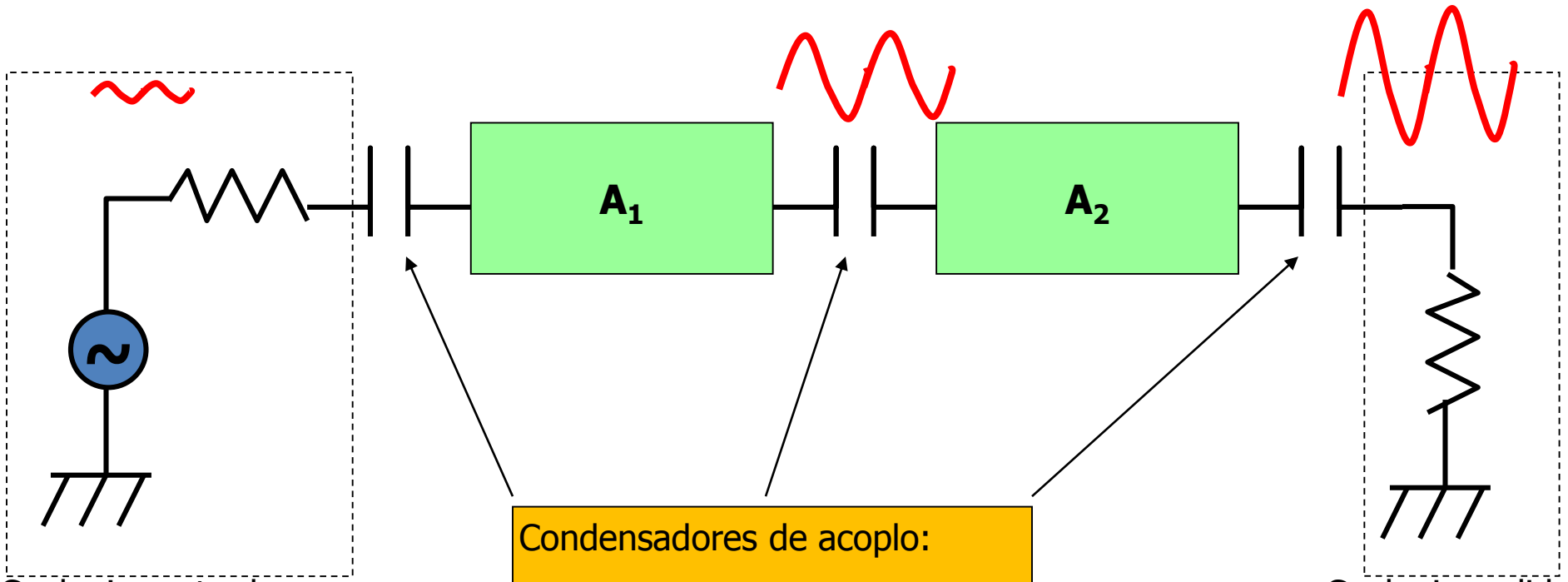


Diagrama de Bode

El efecto de los condensadores de acoplo



$$X_C = \frac{1}{2\pi f C}$$