

TE 046

DISPOSITIVOS ELETRÔNICOS

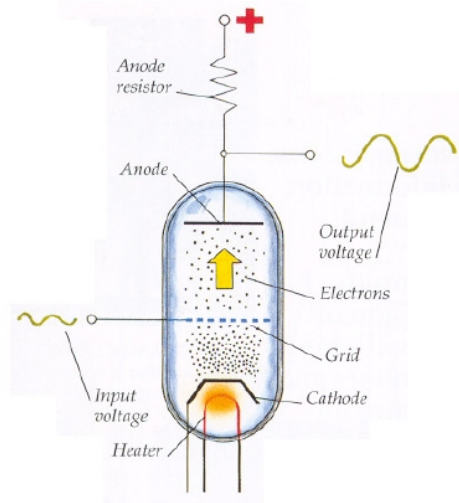
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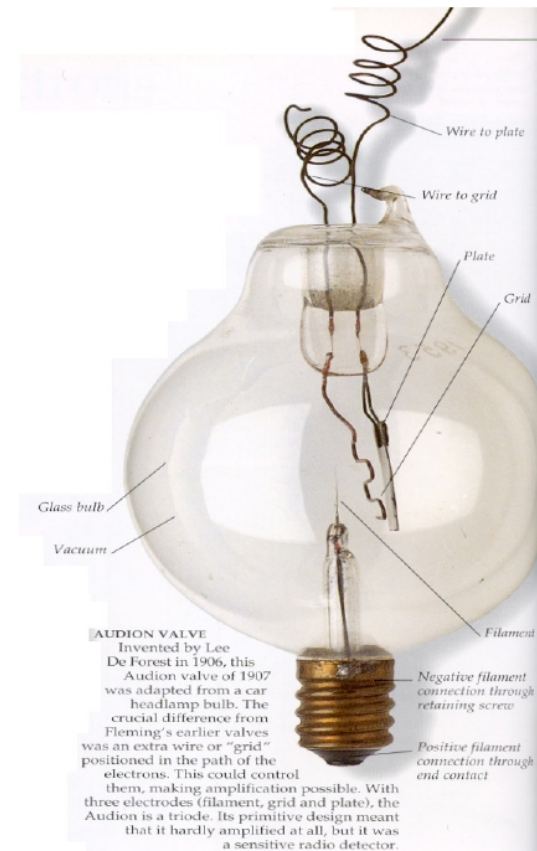
1. INTRODUÇÃO

1.1. DA ELETRÔNICA À MICROELETRÔNICA

1906 Lee de Forest developed the triode vacuum tube (Audion)
Age of electronics begins.

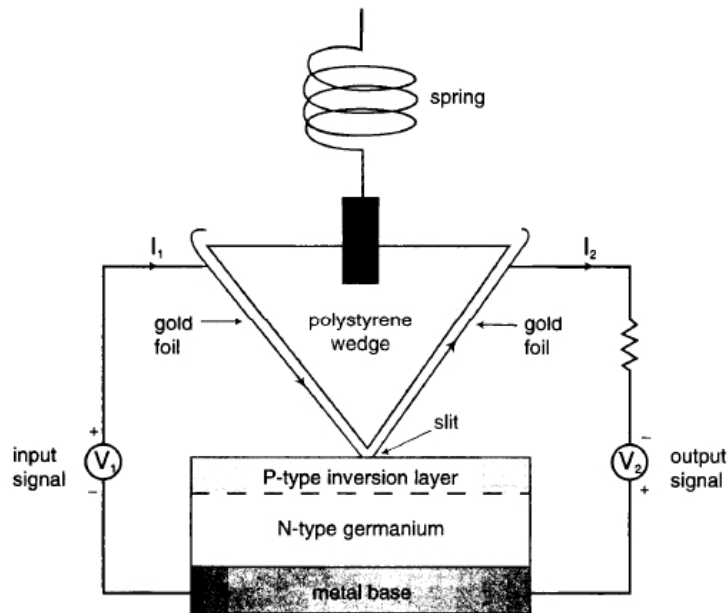


Audion photograph (right) and schematics (up)

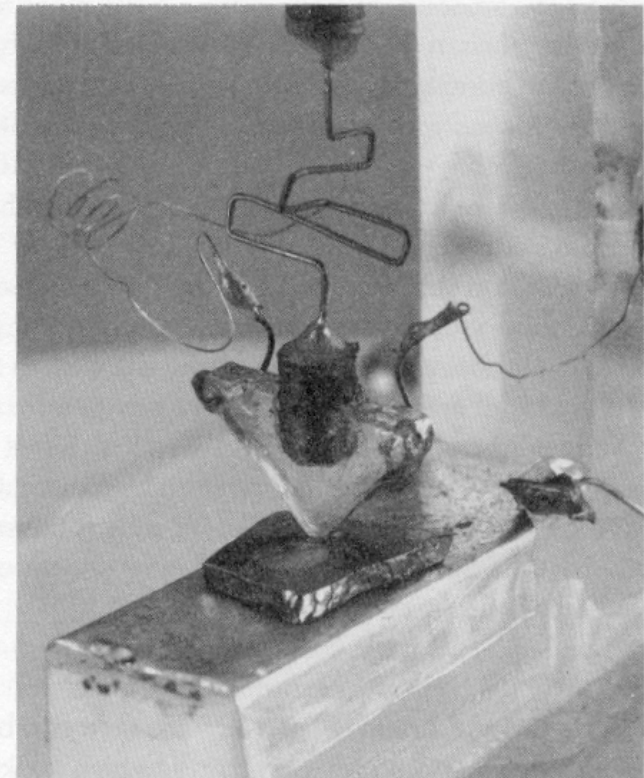


1º Transistor – Bardeen, Brattain e Schokley - Laboratórios Bell

Point contact transistor 1947

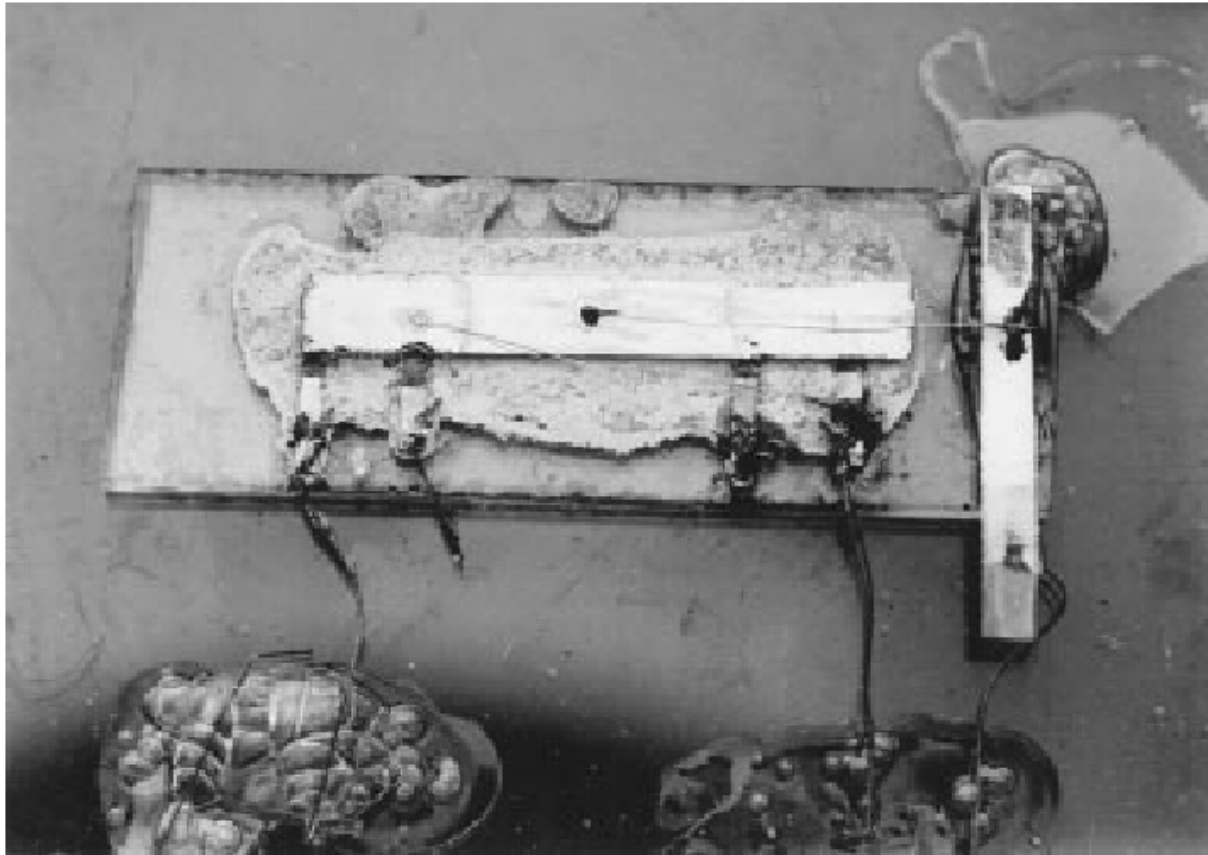


Bardeen and Brattain's point-contact semiconductor amplifier.

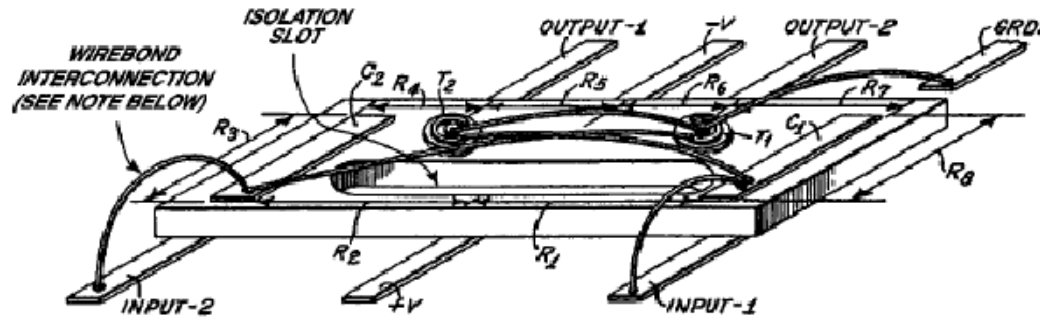


1º Circuito Integrado – Kilby - Texas Instruments

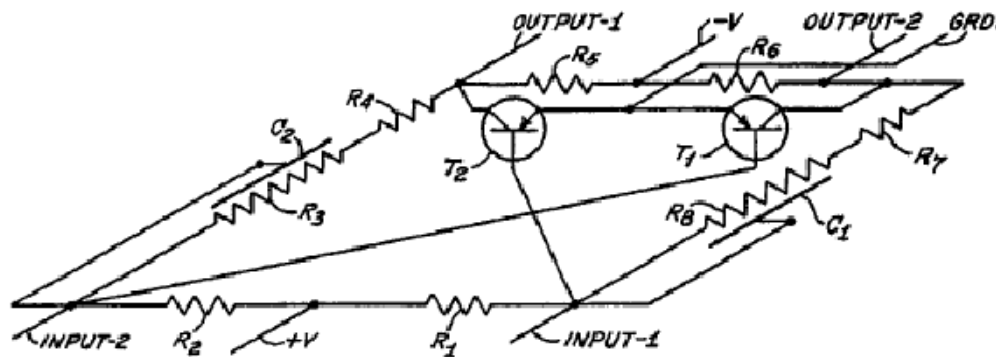
First integrated circuit (TI, 1958)



Schematics of the first IC

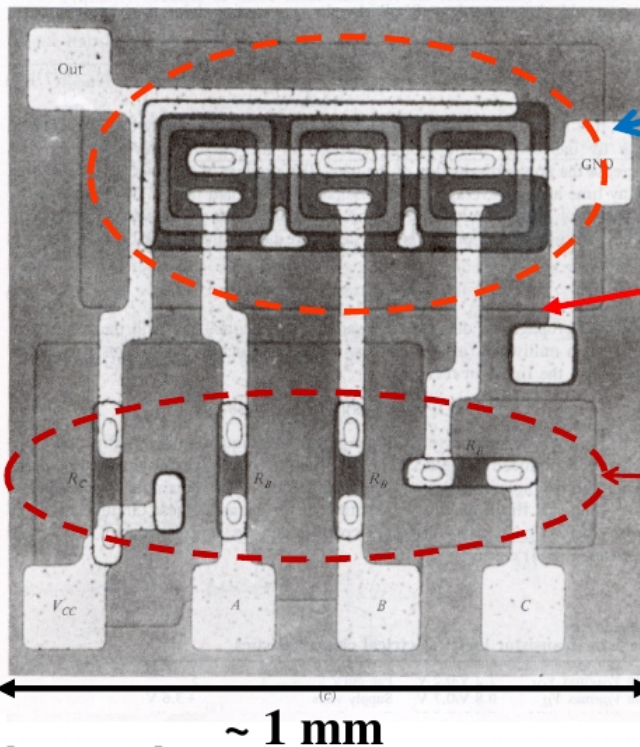
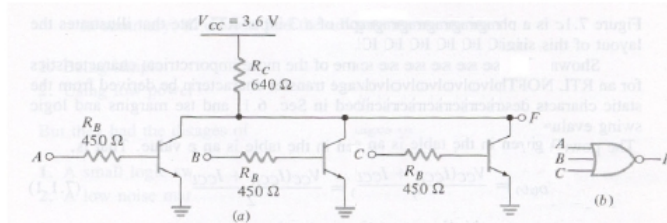


Note: Wirebonds were used several places for interconnection



Fairchild

1962: Resistor-transistor logic (TTL) First IC with wide acceptance in the commercial market



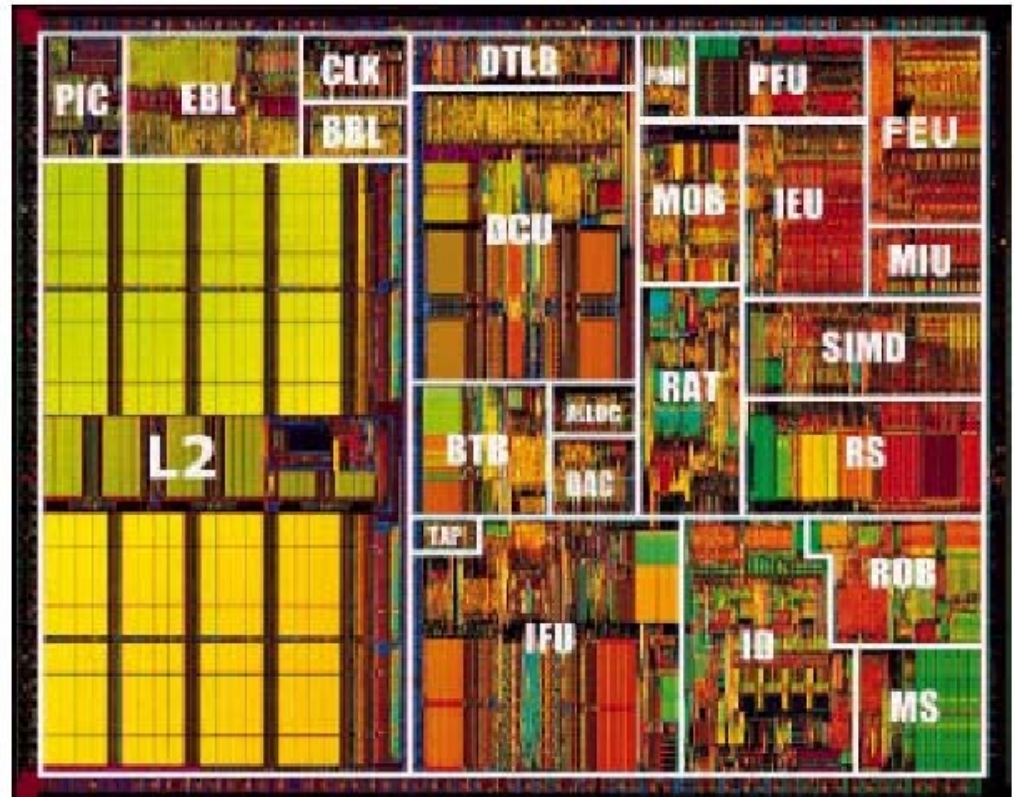
Transistors

Connection metal

Resistors

Source: Wikipedia & Jaeger

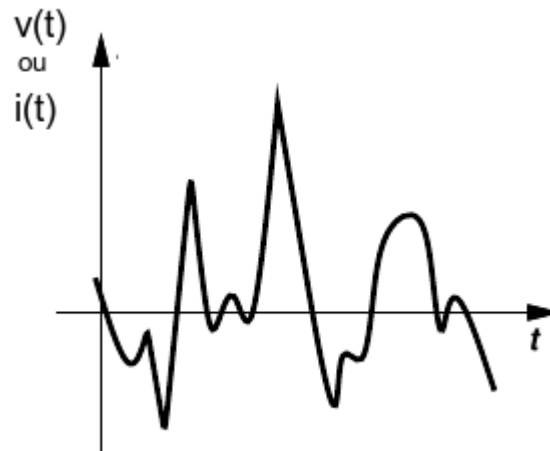
- ◆ Intel Pentium III
- ◆ 0.18 micron process
- ◆ 28 million transistors



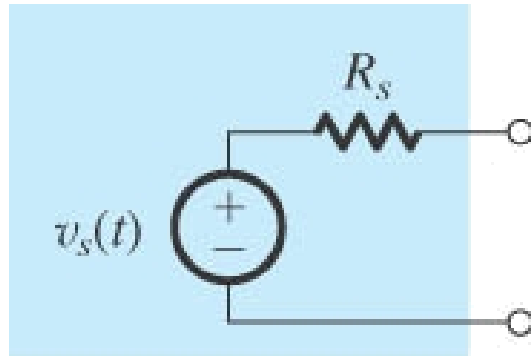
1.2. SINAIS ELÉTRICOS

O objetivo dos circuitos eletrônicos é o processamento de sinais elétricos.

Sinais elétricos são correntes ou tensões que contêm informação.

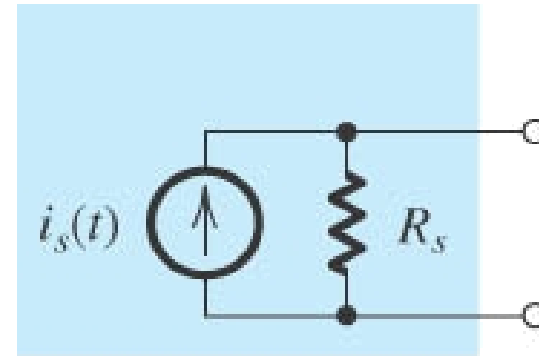


1.2.1 Representação de Sinais



(a)

Thévenin

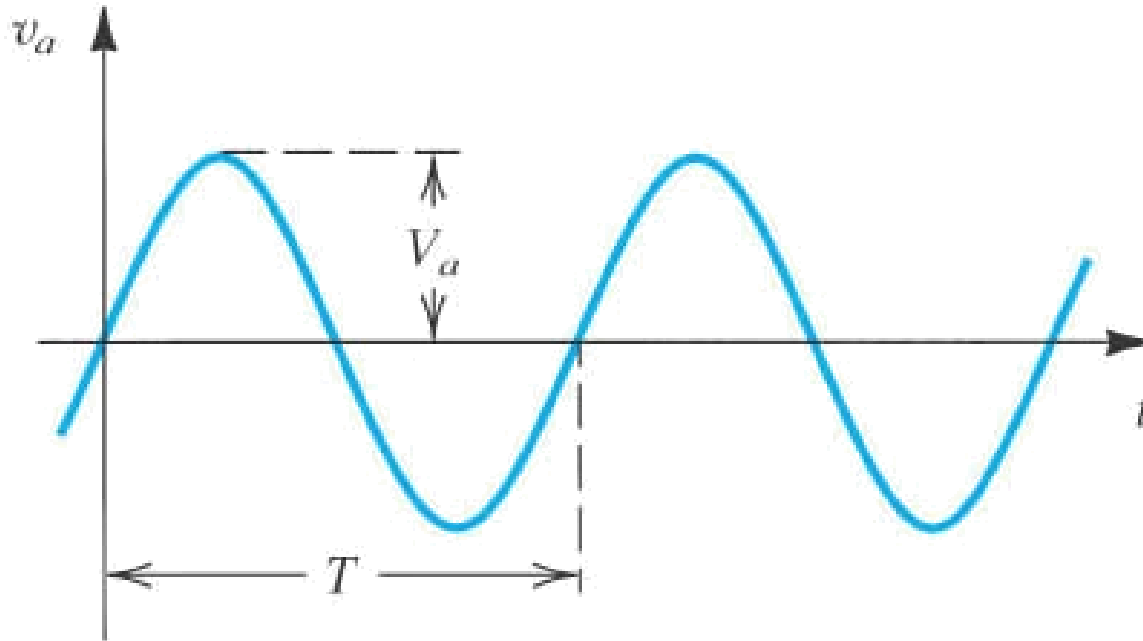


(b)

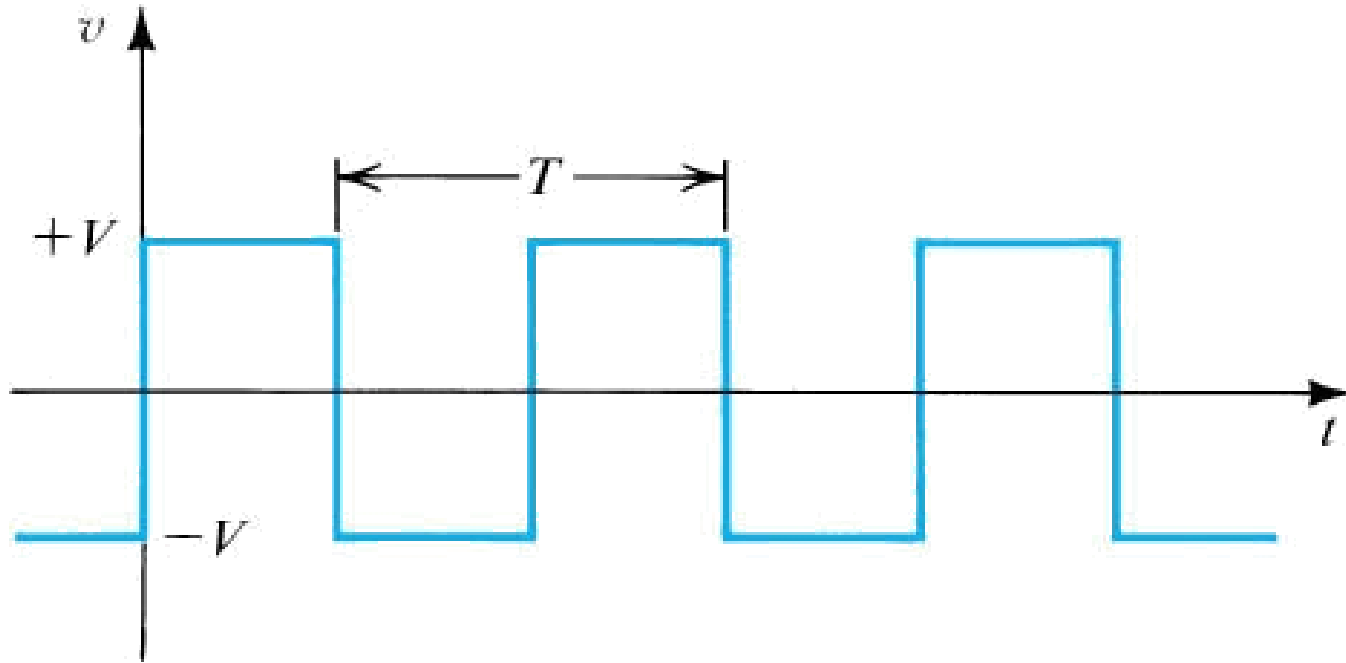
Norton

1.2.2 Espectro de Frequências de Sinais

Um sinal senoidal é caracterizado por sua amplitude V_a e por seu período T (ou frequência $f = 1/T$)



Um sinal periódico no tempo pode ser representado por uma soma de senóides, ou seja, por uma série de Fourier.



$$v(t) = \frac{4V}{\pi} \left(\sin \omega_0 t + \frac{1}{3} \sin 3 \omega_0 t + \frac{1}{5} \sin 5 \omega_0 t + \dots \right)$$

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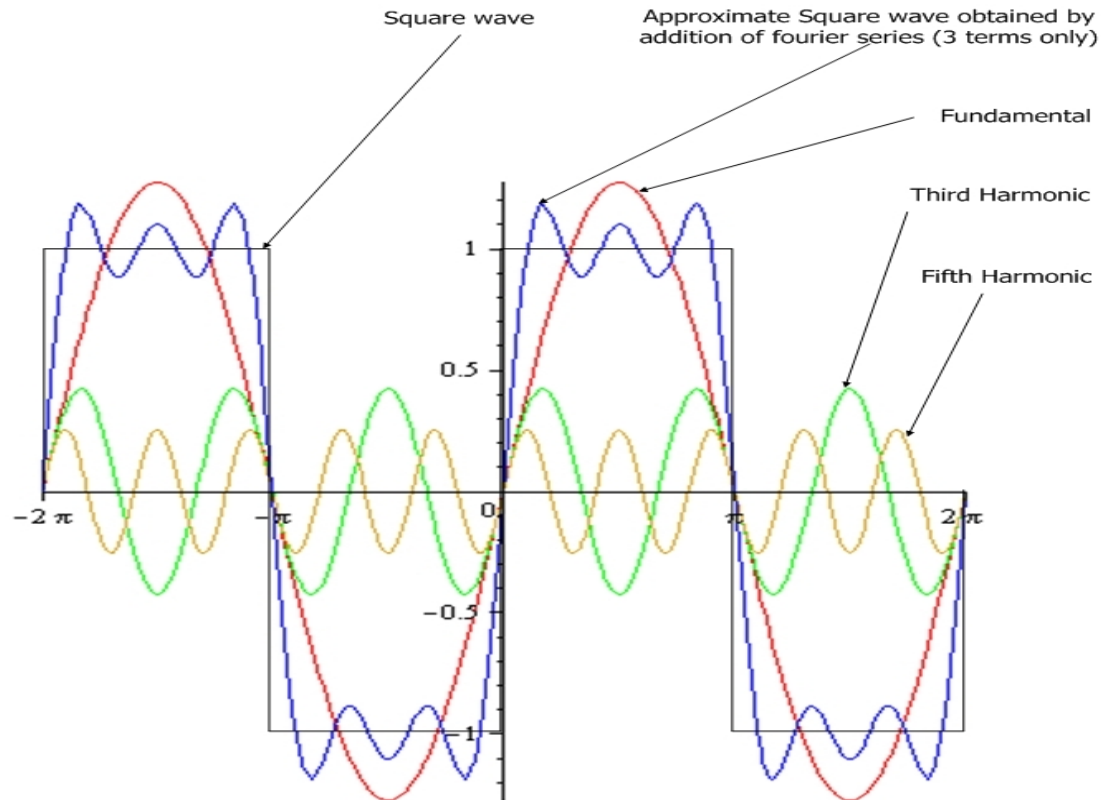
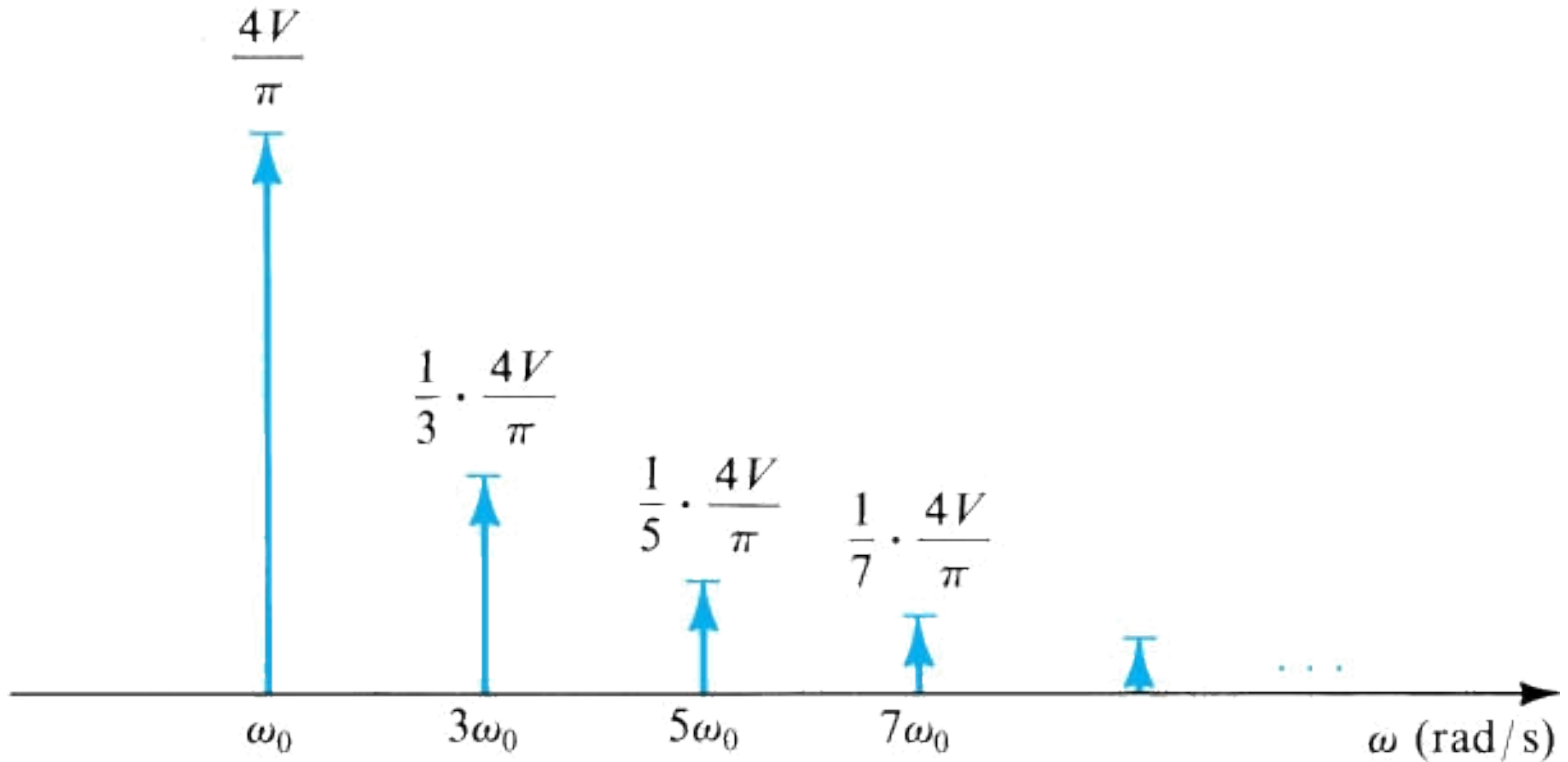
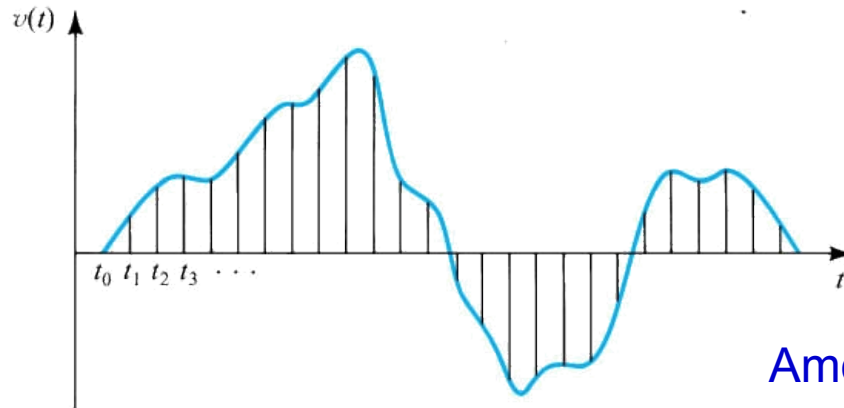


Fig-C : Square wave and its Fourier series (only first three terms are taken)

Representação no domínio da frequência ou espectro de frequência da onda quadrada

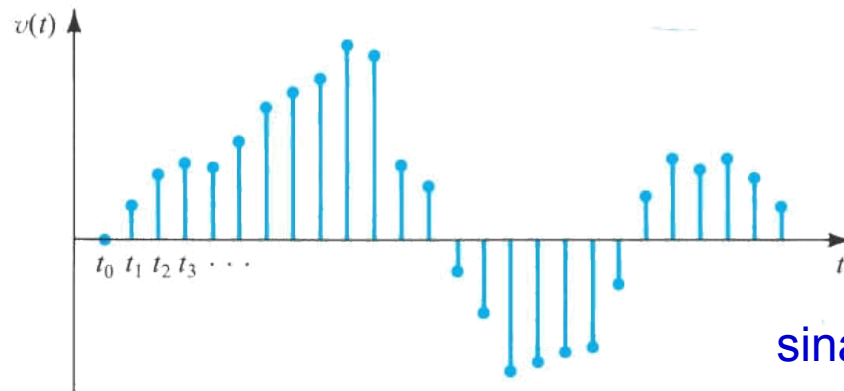


1.2.3 Sinais Analógicos e Sinais Digitais



Amostragem do sinal analógico

(a)



sinal discreto no tempo

(b)

Sinais Analógicos X Sinais Digitais

