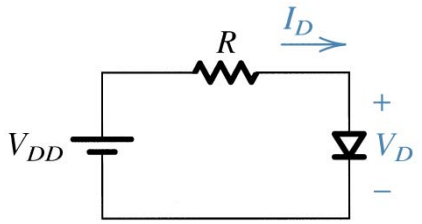
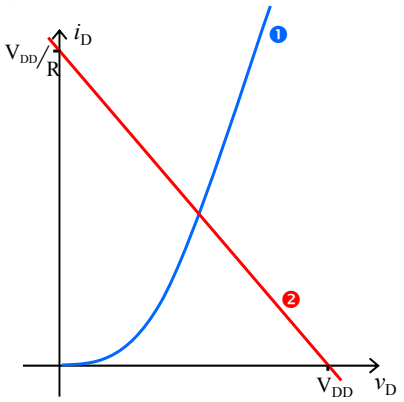
1.4 – Análise de Circuitos com Diodos



❶ Do Diodo: $I_D = I_S . e^{\frac{V_D}{n.V_T}}$

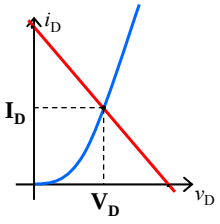
❷ Do Circuito: $I_D = \frac{V_{DD} - V_D}{R}$

(Equação da Reta de Carga)

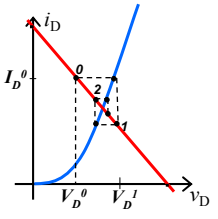


Solução do Problema:

Gráfica



Iterativa

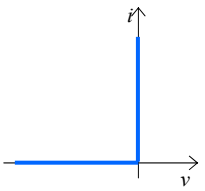


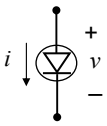
Não são práticas

Modelos simplificados

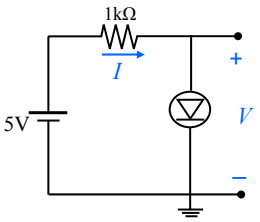
Modelos Simplificados de Diodos

i) Diodo Ideal





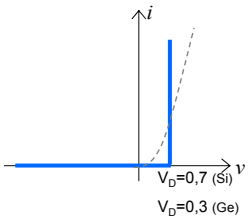
Exemplo:

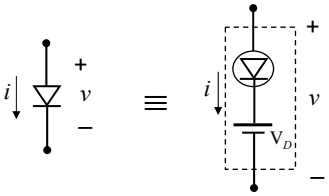


Diodo conduz $\Rightarrow V = 0\text{V}$

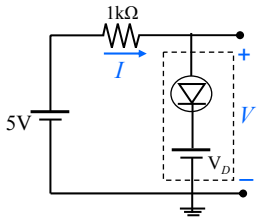
logo: $I = \frac{5}{1k} \Rightarrow I = 5\text{mA}$

ii) Queda de Tensão Constante





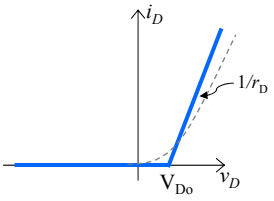
Exemplo:

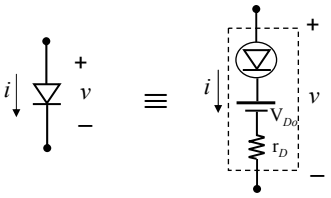


Diodo conduz $\Rightarrow V = \text{V}_\text{D} = 0{,}7\text{V}$ (Si)

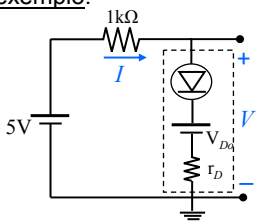
logo: $I = \frac{5-0{,}7}{1k} \Rightarrow I = 4{,}3\text{mA}$

iii) Linear por Partes





No exemplo:



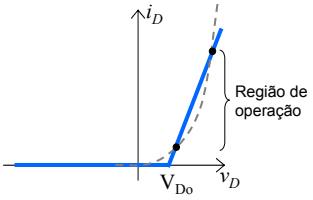
Diodo conduz $\Rightarrow V = V_{Do} + r_D.I$

$$I = \frac{5 - V_{Do}}{1k + r_D}$$

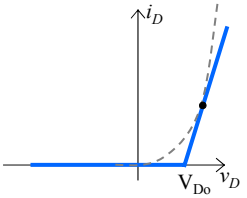
Logo, para r_D=10Ω e V_{Do}=0,65:

$I = 4{,}31\text{mA}$ e $V = 0{,}69\text{V}$

Modelo Linear por partes



Aproximação Secante
("grandes-sinais")



Aproximação Tangente
(pequenos-sinais)

Análise de Pequeno-sinal