

Funções de Ativação

Limitam a variação do sinal de saída do neurônio

Podem assumir valor:

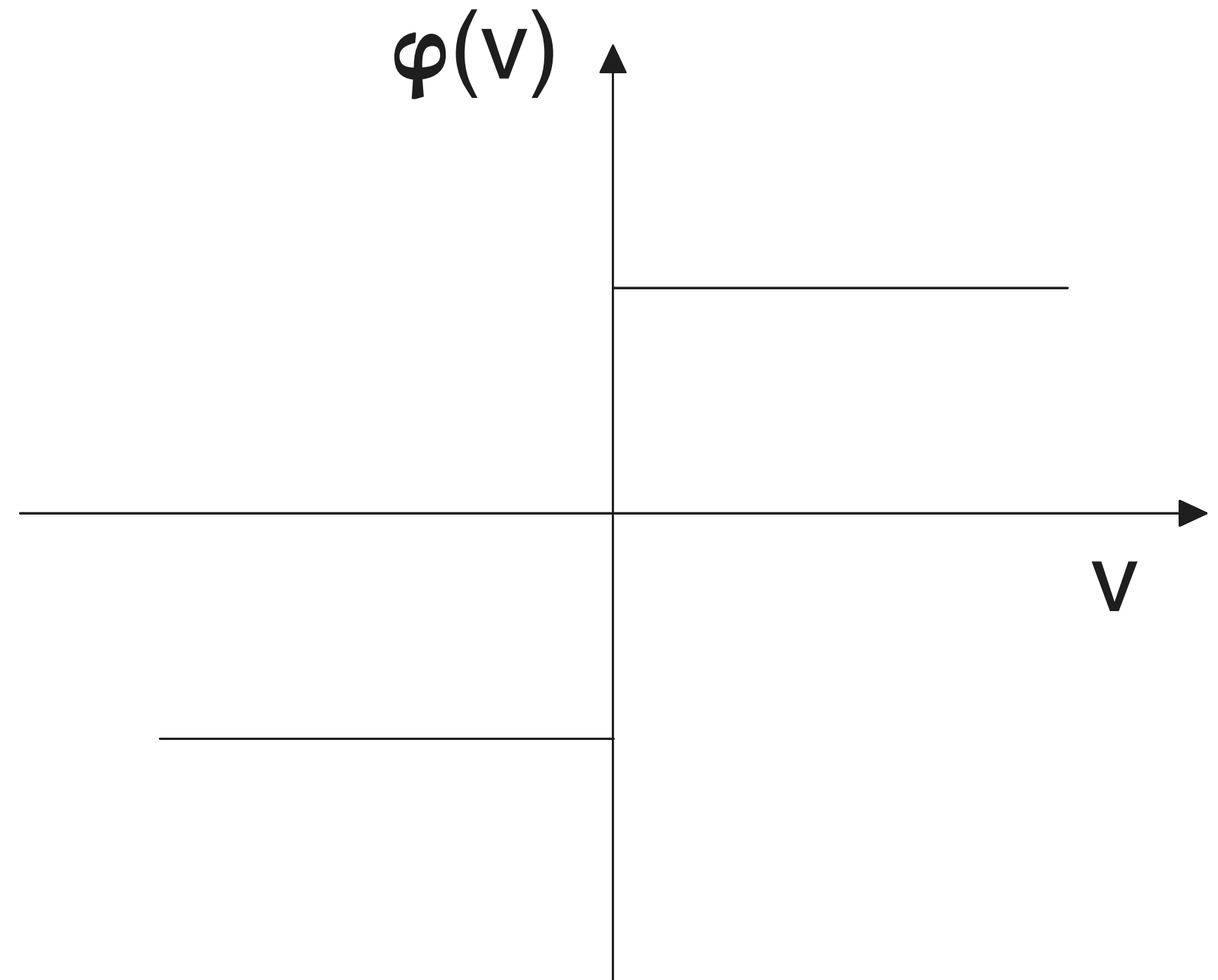
- binário unipolar (0 ou 1)

- binário bipolar (-1 ou 1)

- real

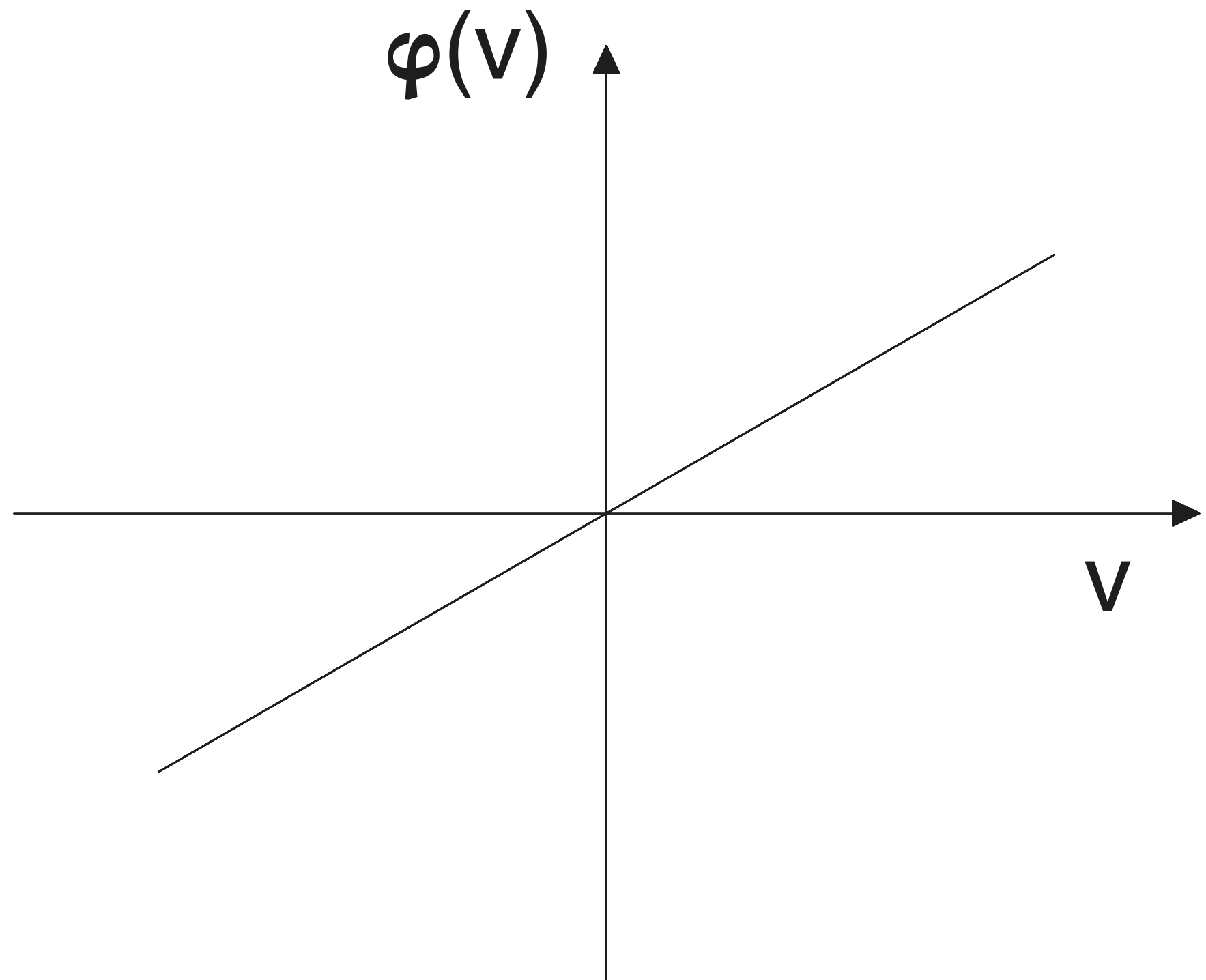
Função Degrau

$$\varphi(v) = \begin{cases} +1, & \text{se } v \geq 0 \\ -1, & \text{se } v < 0 \end{cases}$$



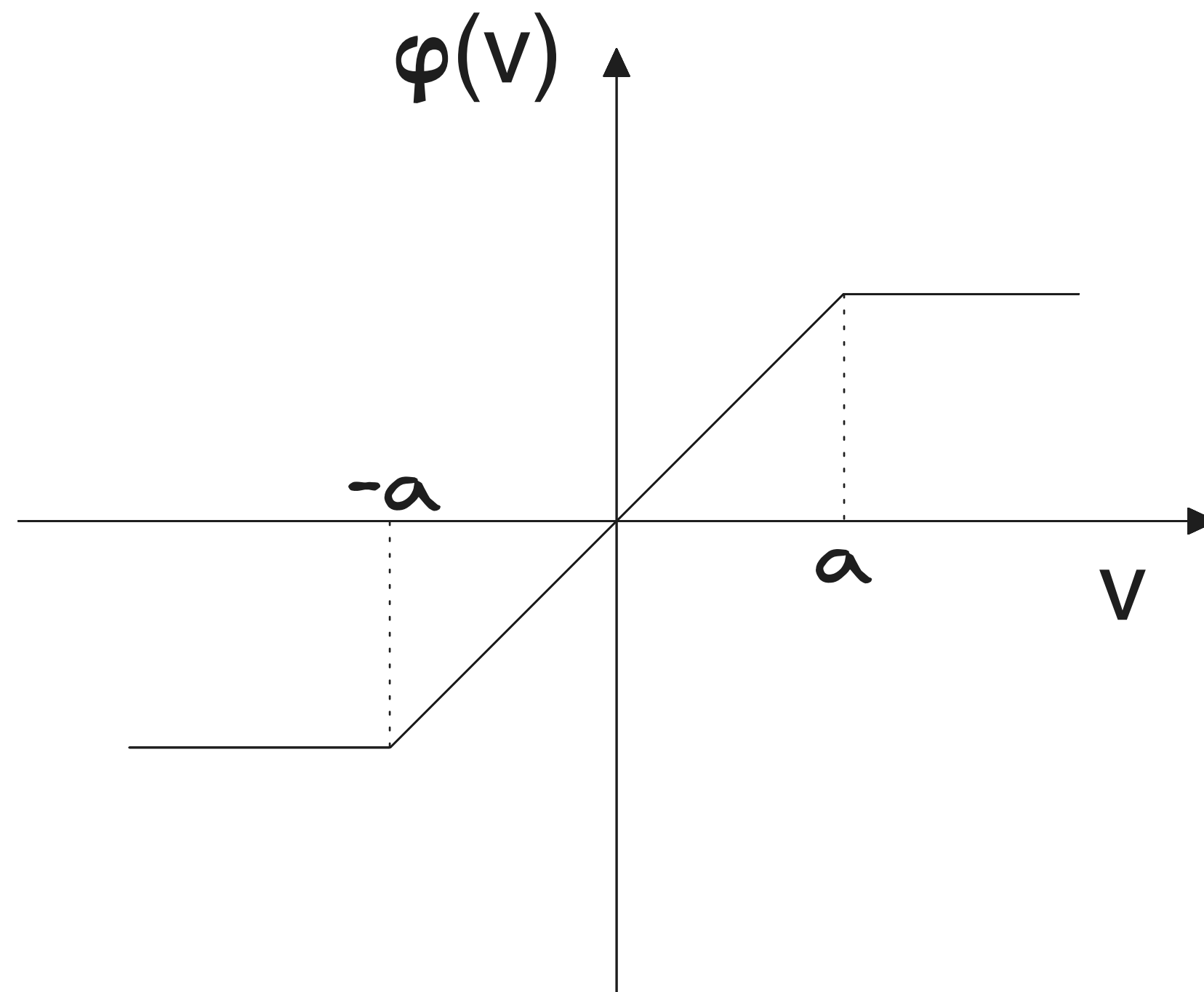
Função Linear Irrestrita

$$\varphi(v) = \alpha v$$



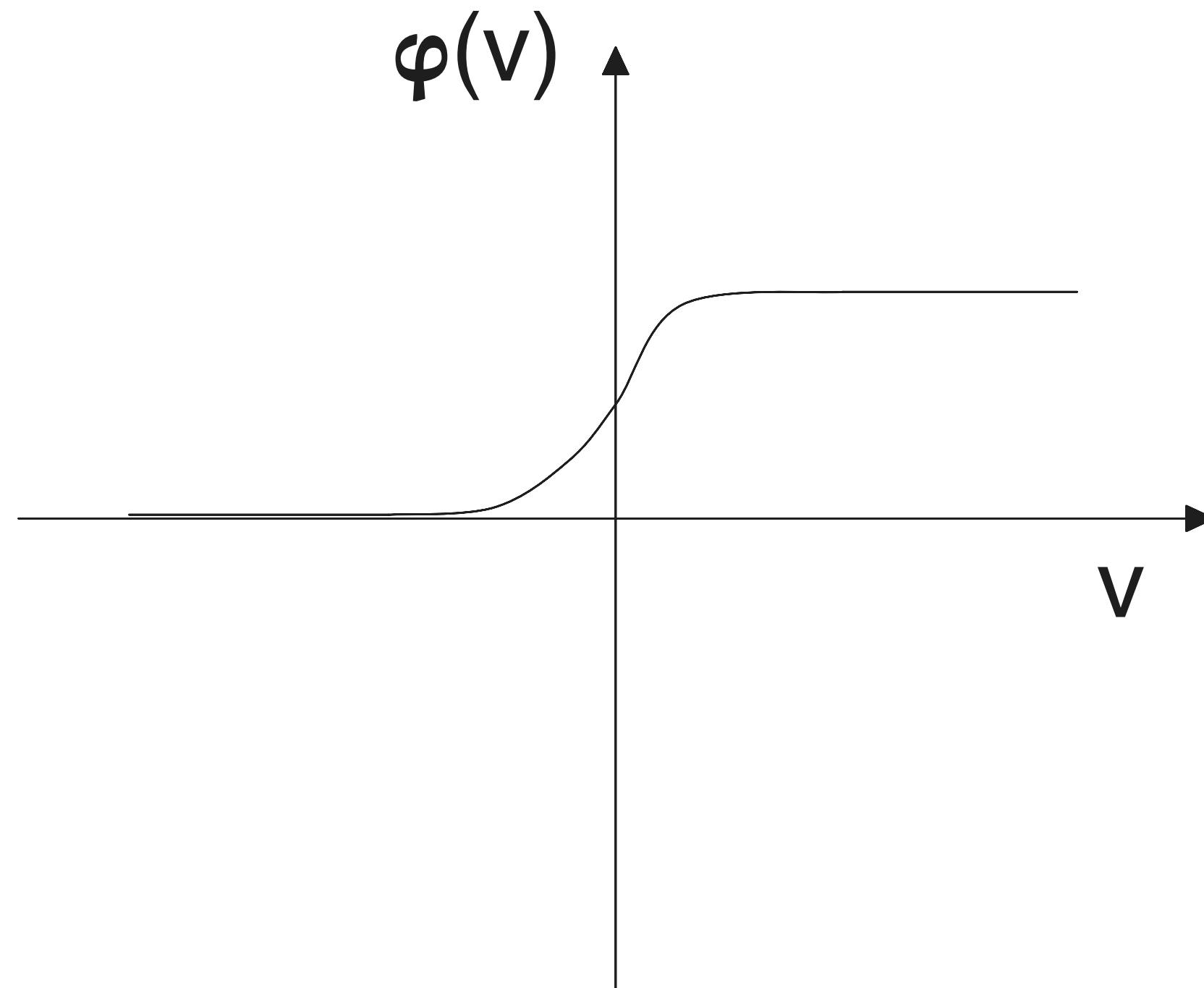
Função Saturação

$$\varphi(v) = \begin{cases} +1, & \text{se } v \geq a \\ v, & \text{se } -a < v < a \\ -1, & \text{se } v \leq -a \end{cases}$$



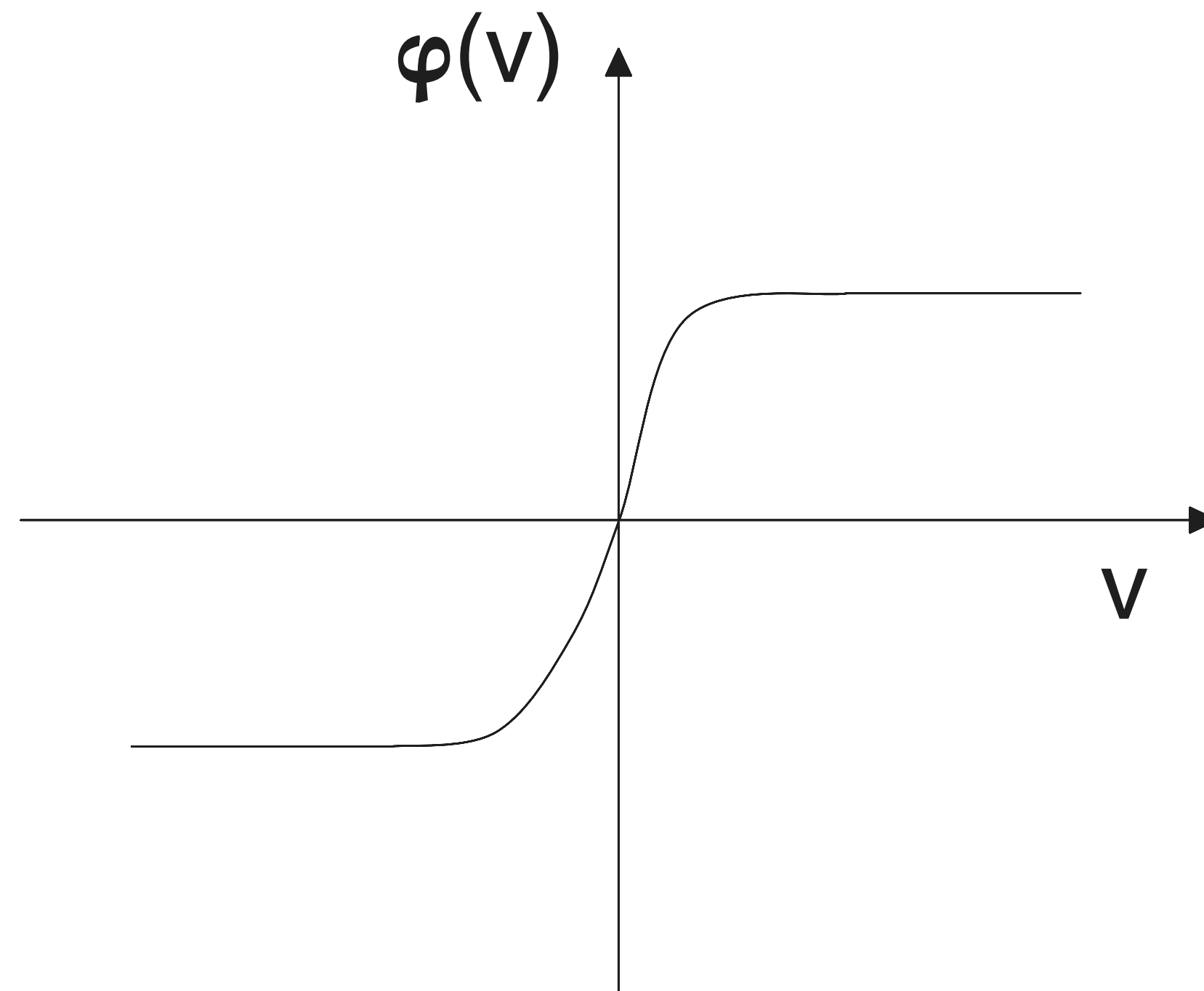
Função Sigmoid

$$\varphi(v) = \frac{1}{1 + e^{-\beta v}}$$



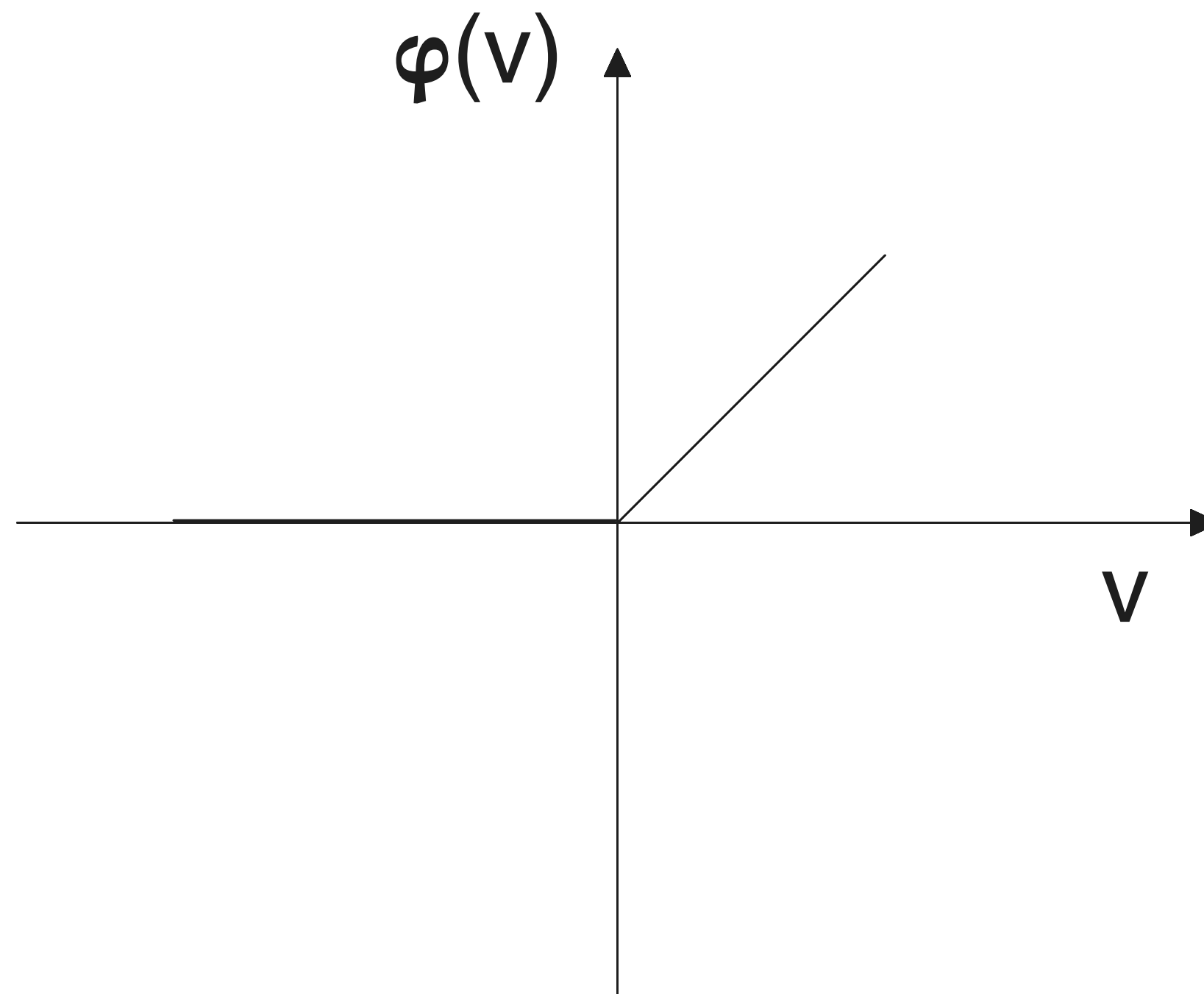
Função Tanh

$$\varphi(v) = \tanh(v)$$



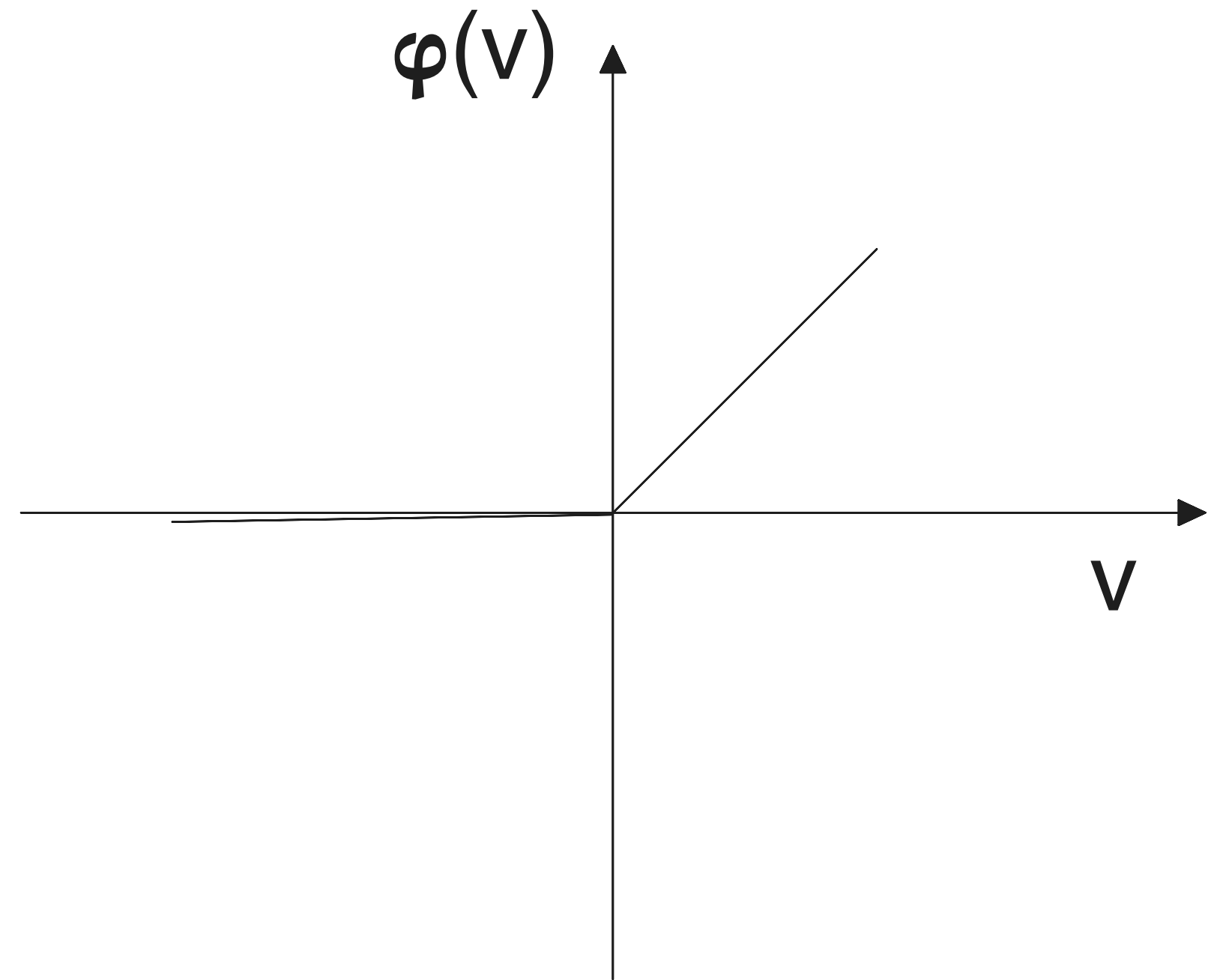
Função ReLU

$$\varphi(v) = \max(0, v)$$



Função Leaky ReLU

$$\varphi(v) = \begin{cases} v, & \text{se } v > 0 \\ \alpha v, & \text{se } v \leq 0 \end{cases}$$



Outras funções de ativação modernas:

Softplus

ELU

GELU

SELU