

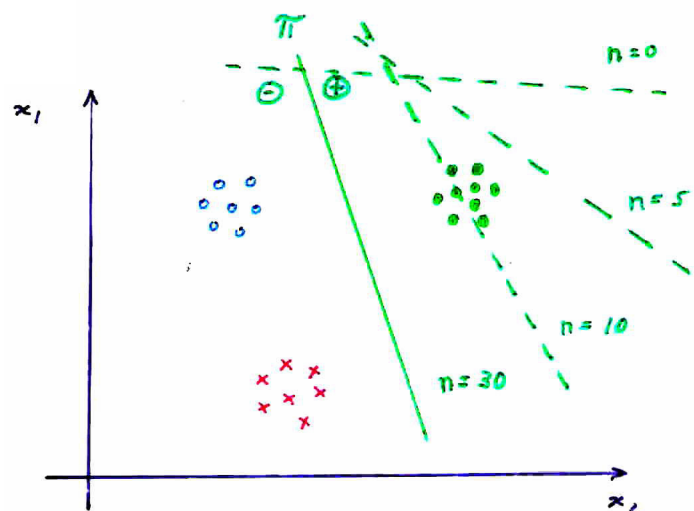
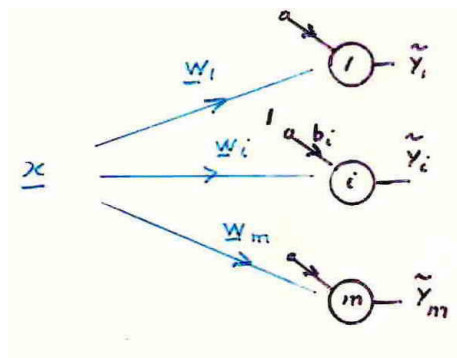
Demo Classificadores

Interpretação geométrica

Rede 1 camada

Cada neurônio treina e opera de forma independente dos demais

Treinamento



Caso simples

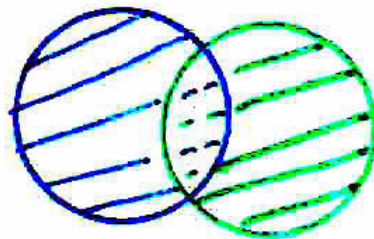
- Efeito da população



1a 50% 50%

1b 80% 20%

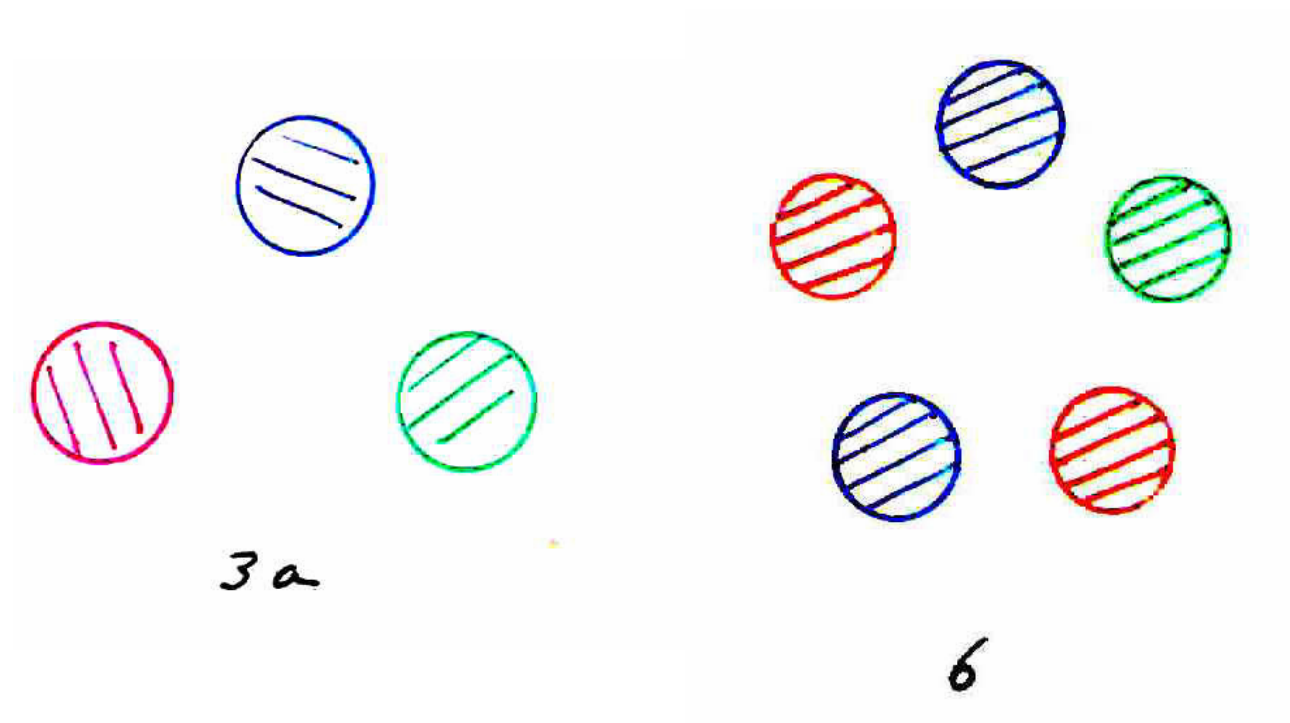
Efeito da população – agora com consequências



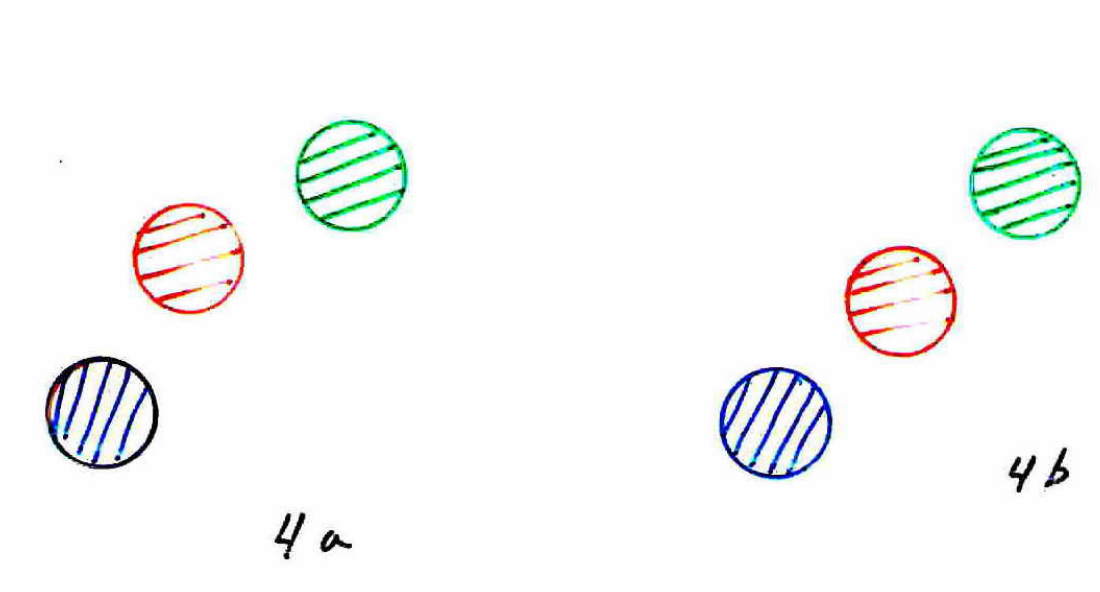
2a 50% 50%

2b 80% 20%

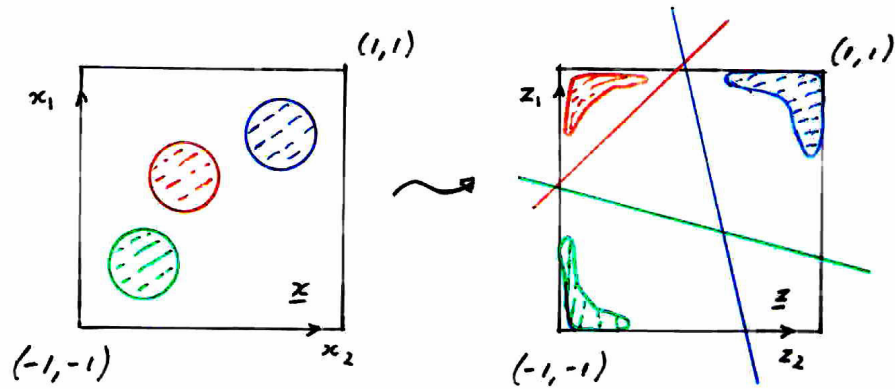
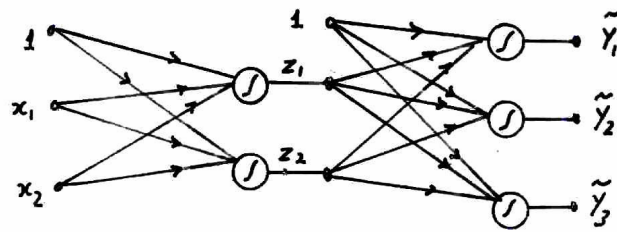
Mais classes



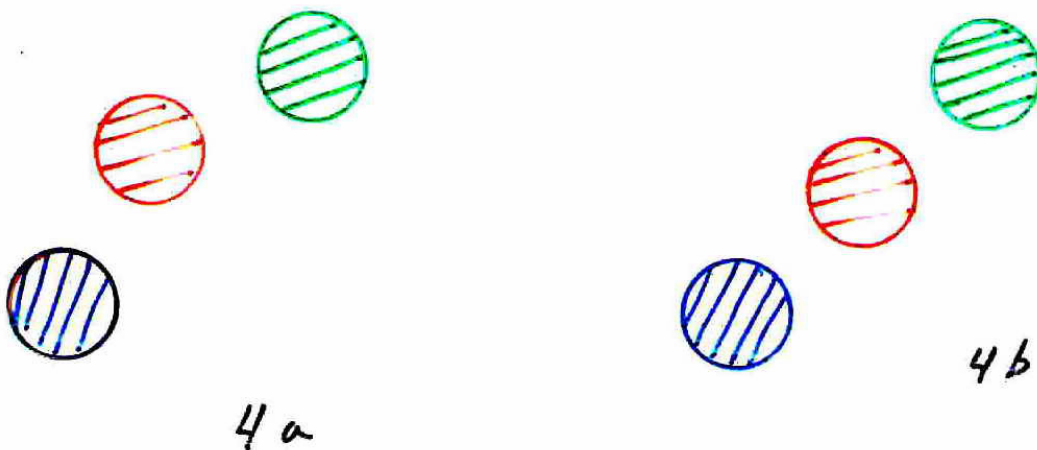
Casos não linearmente separáveis



Rede com duas camadas

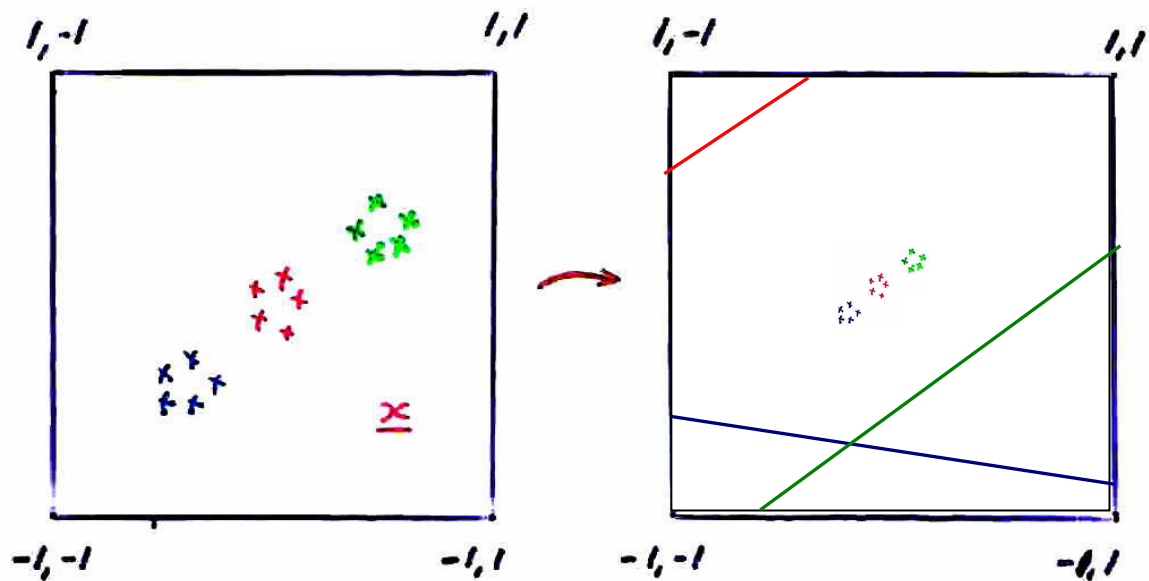


Casos não linearmente separáveis

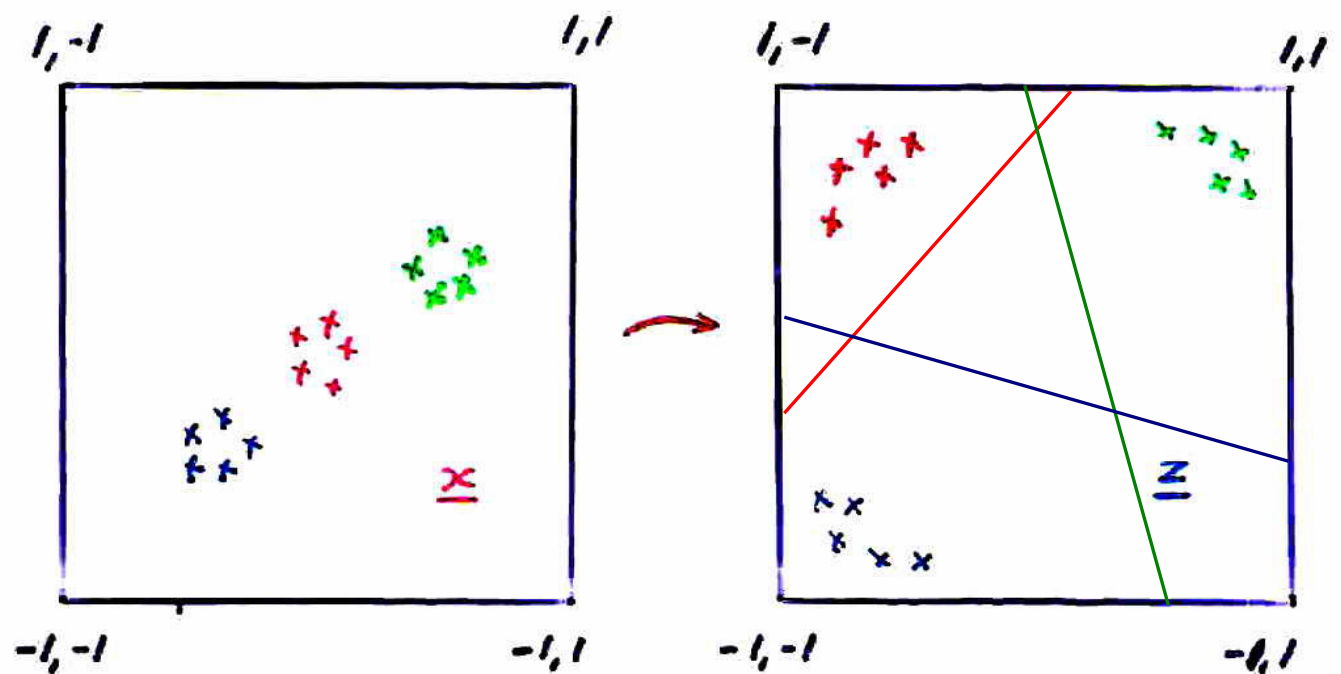


Evolução do treinamento

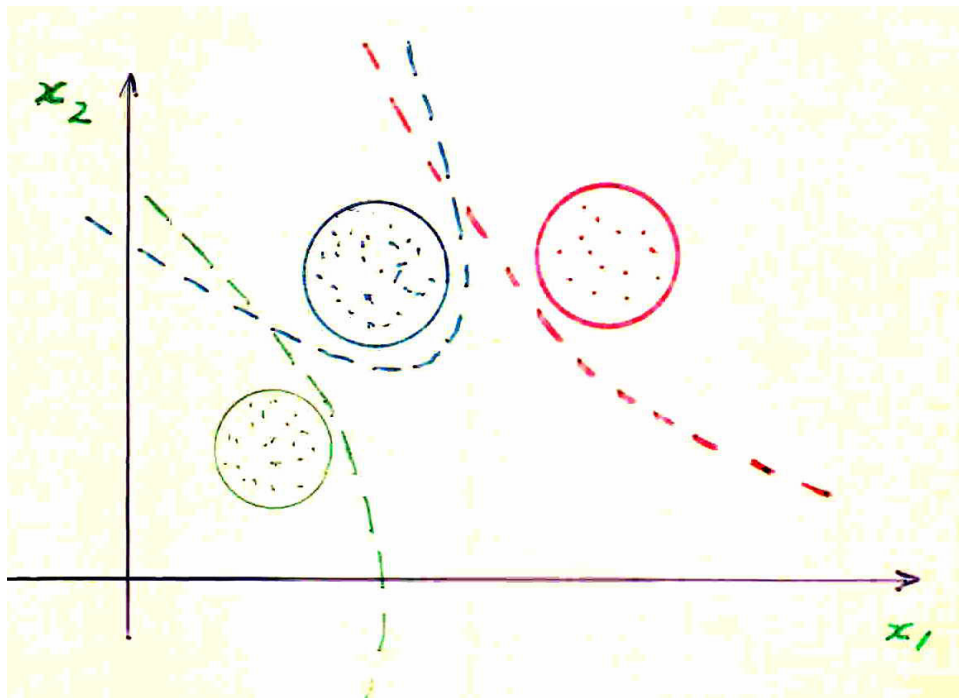
posição inicial



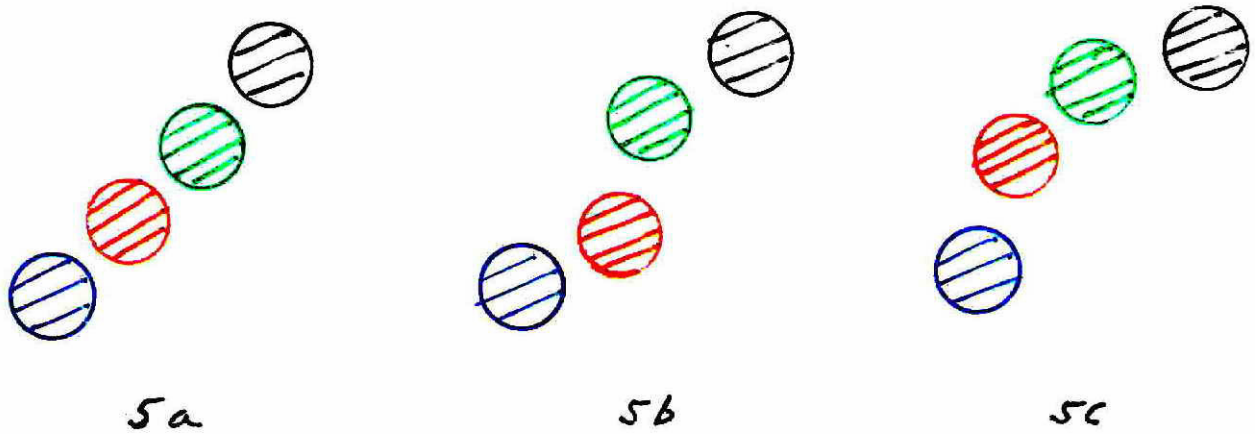
evolução

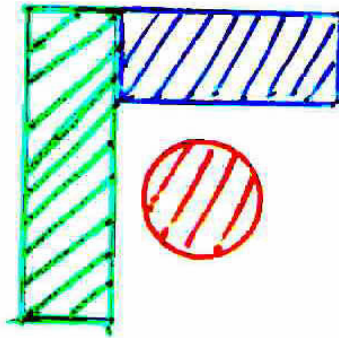


Partição do espaço da entrada

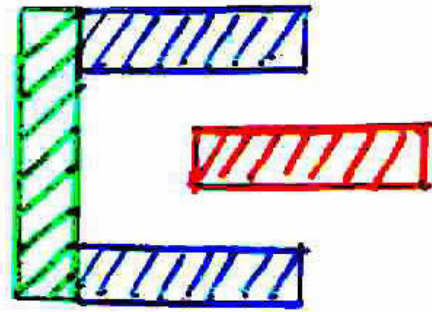


Casos mais complexos



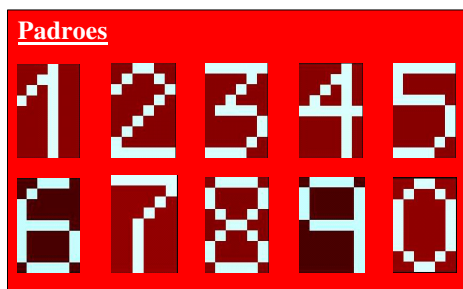
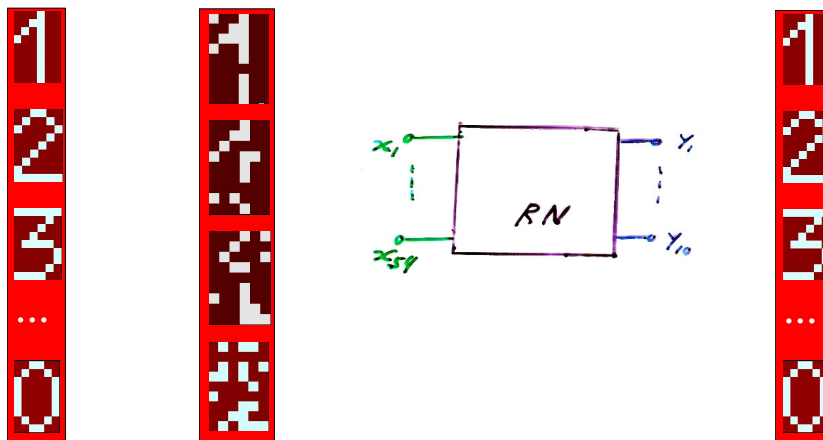


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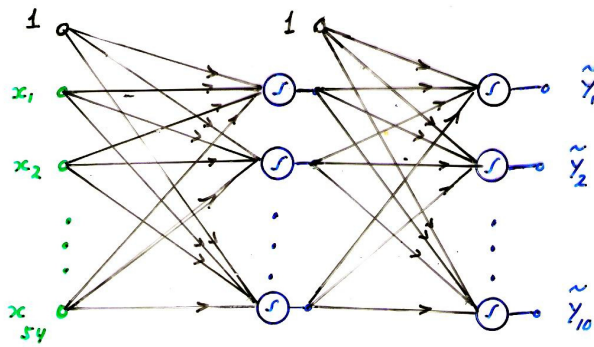


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Demo: OCR Neural



Rede Neural



$\dim \underline{x} = 54$ $\dim \underline{y} = 10$ componentes binarias

2 camadas de neurônios

neurônios camada intermediária: 1 – 30

Passo treinamento .1 , max 500 épocas

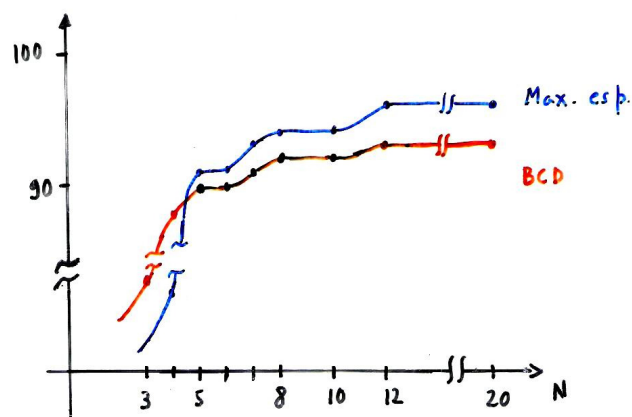
Ruído: 0 – 20 %

Capacidade de Mapeamento

$$R_{\text{treino}} = R_{\text{teste}} = 15 \%$$

1 camada >>> 77 % acertos

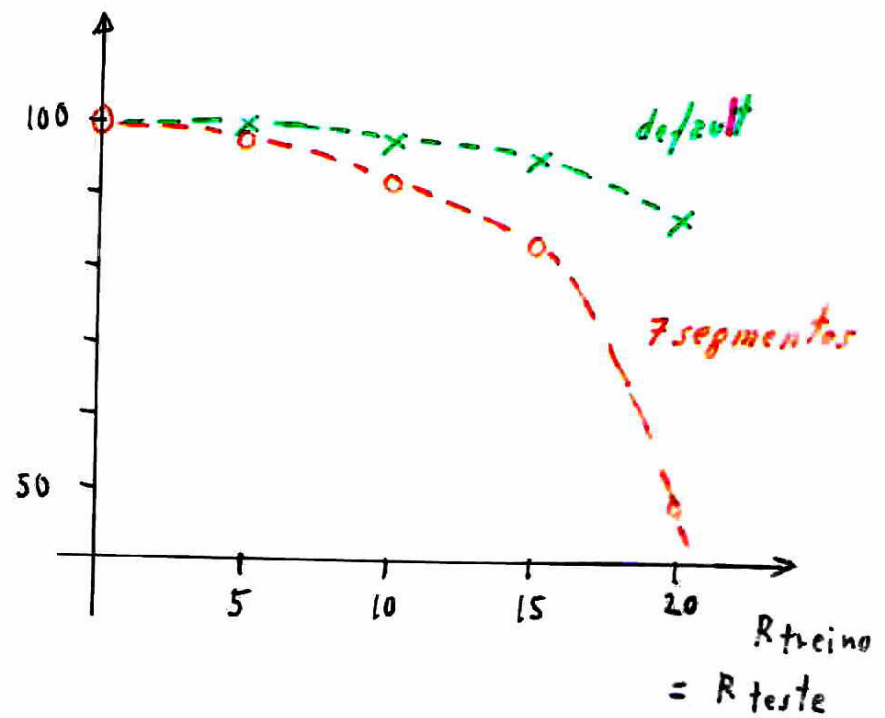
2 camadas $f(N)$ $N = \# \text{ neurônios cam. intermed.}$



Efeito da Separabilidade dos padrões

$$R_{\text{treino}} = R_{\text{teste}}$$

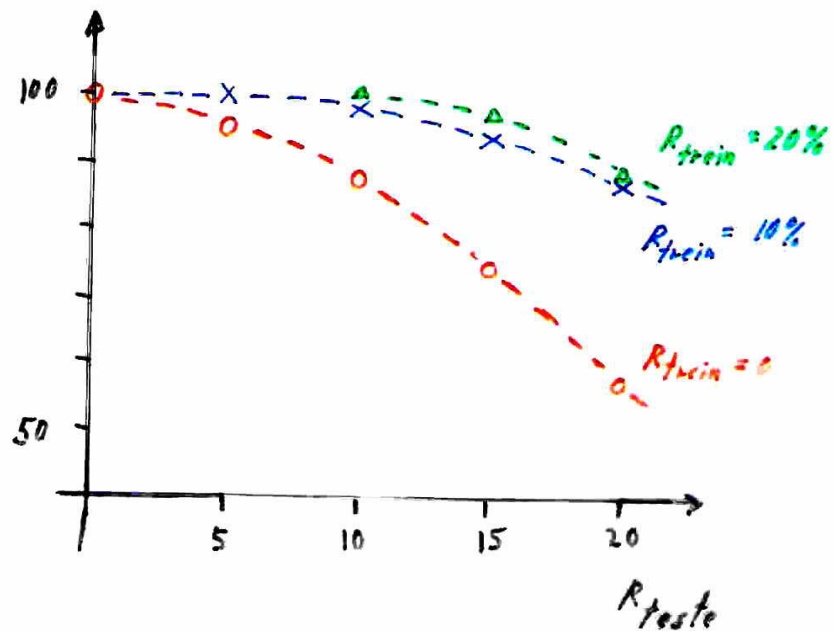
10 neurônios



Efeito das condições de treino e operação

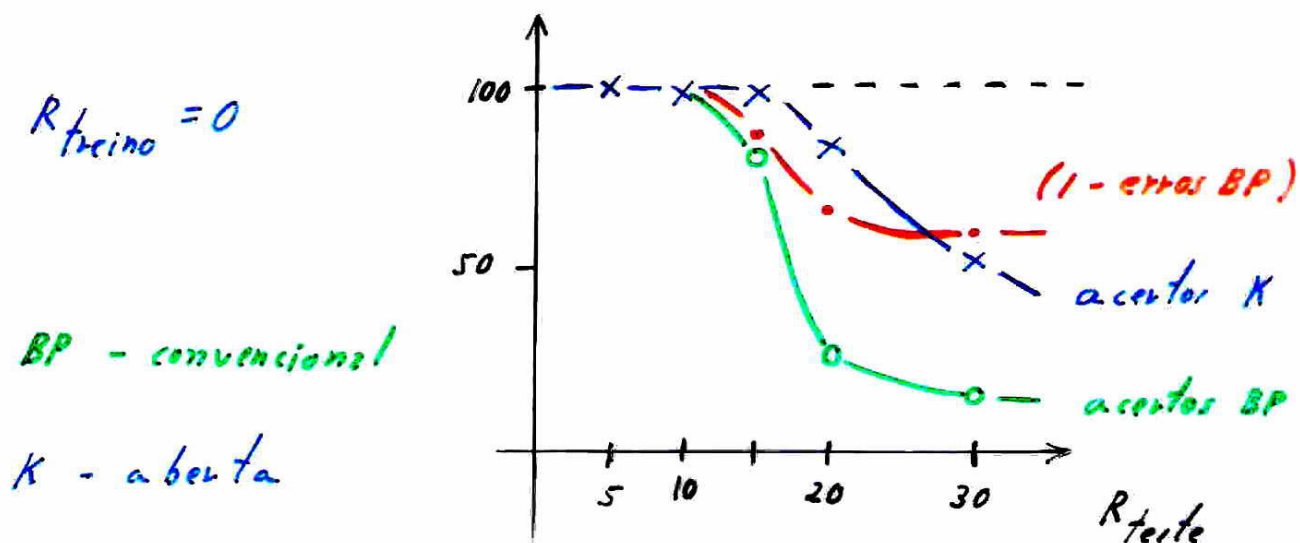
10 neurônios

Padrão = def



Abrindo a classificação

Abrindo a Classificação



Robustez

Morte de neurônios

Neurônio morto: $y = 0$

