

Outline

- RBF and nearest neighbors
- RBF and neural networks
- RBF and kernel methods
- RBF and regularization

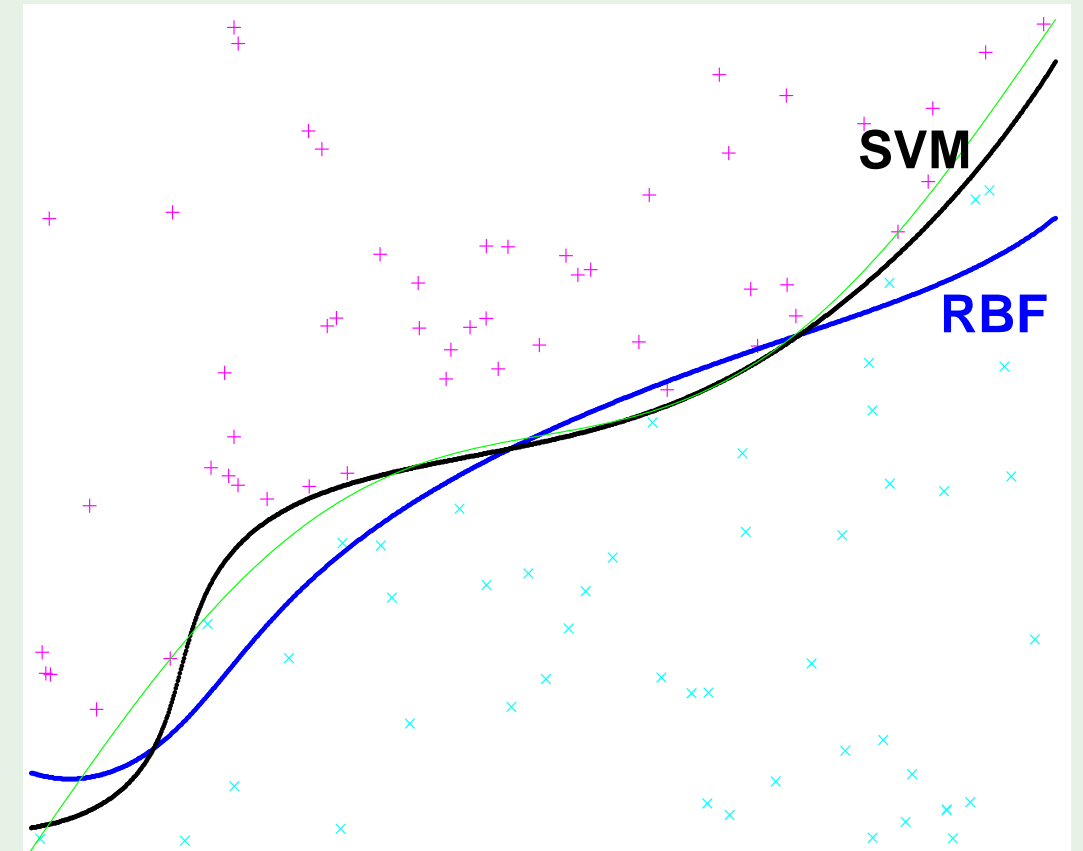
RBF versus its SVM kernel

SVM kernel implements:

$$\text{sign} \left(\sum_{\alpha_n > 0} \alpha_n y_n \exp \left(-\gamma \|\mathbf{x} - \mathbf{x}_n\|^2 \right) + b \right)$$

Straight RBF implements:

$$\text{sign} \left(\sum_{k=1}^K w_k \exp \left(-\gamma \|\mathbf{x} - \boldsymbol{\mu}_k\|^2 \right) + b \right)$$



RBF and regularization

RBF can be derived based purely on regularization:

$$\sum_{n=1}^N (h(x_n) - y_n)^2 + \lambda \sum_{k=0}^{\infty} a_k \int_{-\infty}^{\infty} \left(\frac{d^k h}{dx^k} \right)^2 dx$$

“smoothest interpolation”