

Part 2

Support Vector Machine

a.

We want to find the Lagrangian of the formulation

$$\min_{w, b, \xi} \left\{ \frac{1}{2} w^\top w + \frac{C}{2} \sum \xi_i^2 \right\}$$

subject to $y_i(w^\top w + b) \geq 1 - \xi_i$ and $i \in \{1, \dots, N\}$.

b.

The partial derivative of the Lagrangian from *part a.* with respect to w , b , and ξ is as follows:

Decision Trees

a.

b.

C.

Part 3: Programming

Submitted separately

Part 1: ChatGPT

What is the most used evaluation metrics for classification?

The most commonly used **evaluation metrics for classification** depend on whether the problem is **binary**, **multiclass**, or **imbalanced**, but here are the main ones used across contexts:

1. Accuracy

$$\text{Accuracy} = \frac{\text{Number of correct predictions}}{\text{Total number of predictions}}$$

- **Most used** for balanced datasets.
- **Weakness:** Misleading when classes are imbalanced (e.g., 95% of one class → 95% accuracy by predicting only that class).

What is the most used evaluation metrics for regression?
