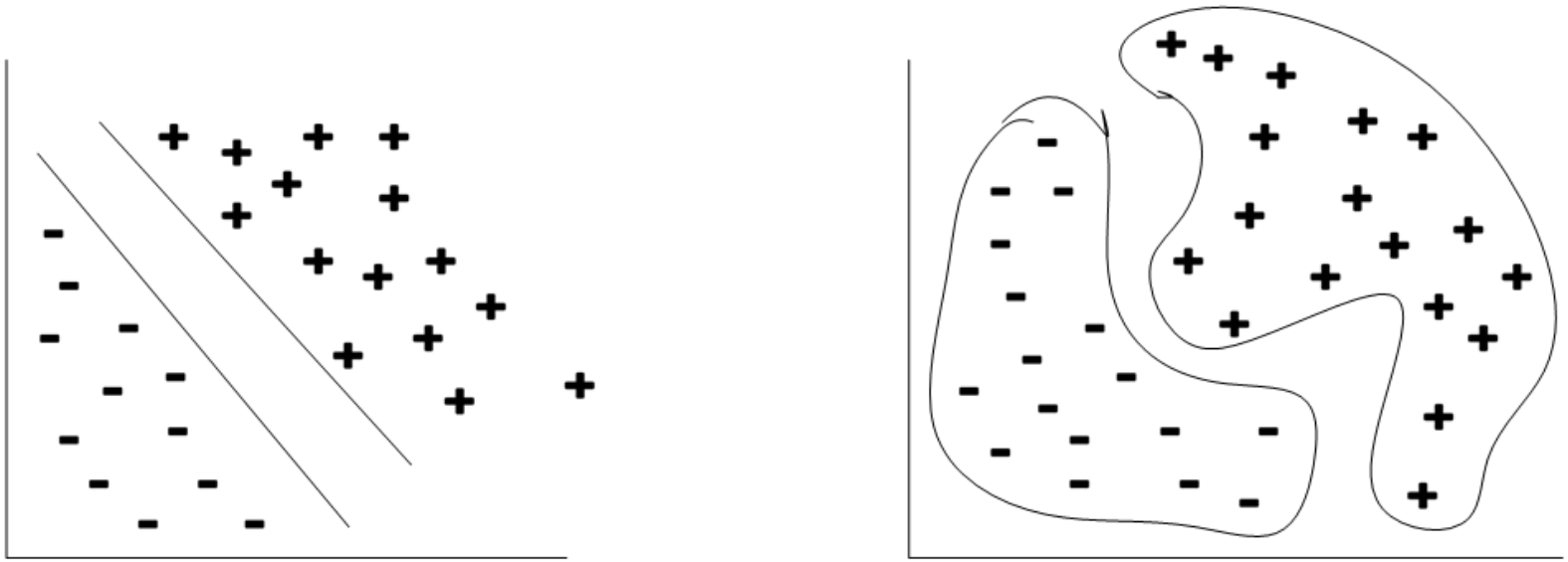
Linear and Non-Linear Separable Data

Figure 9: Two types of training data.

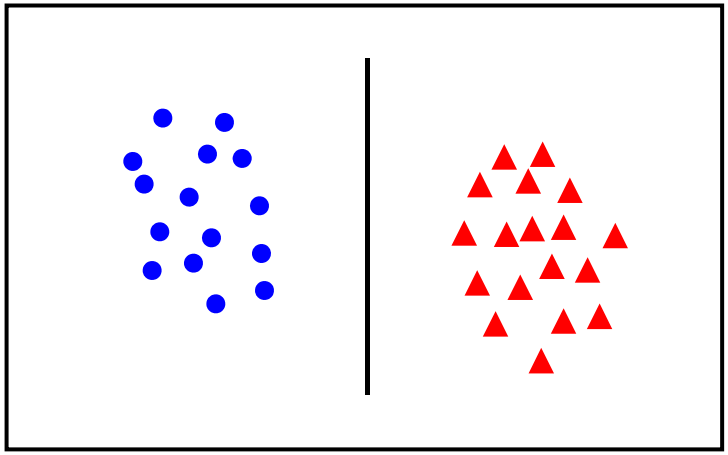


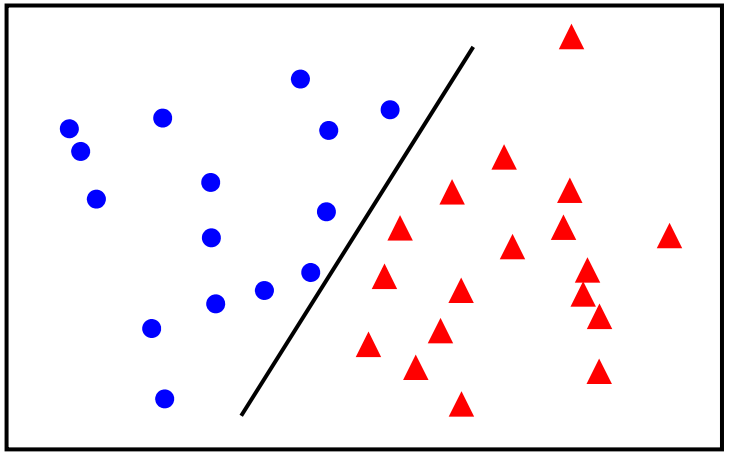
(a) Linearly separable

(b) Linearly non-separable

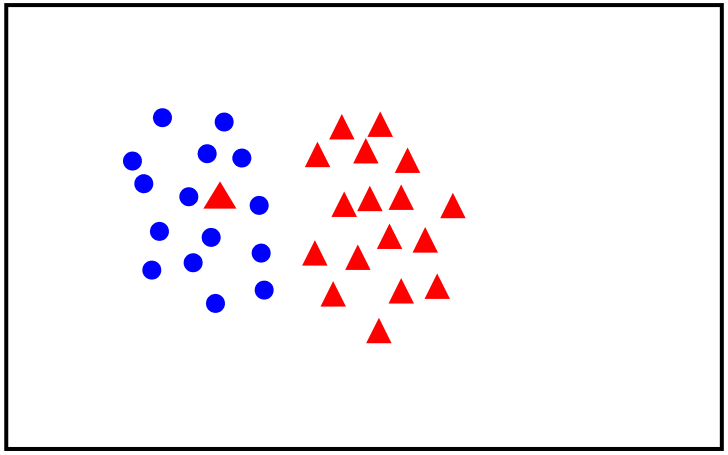
Linear separability

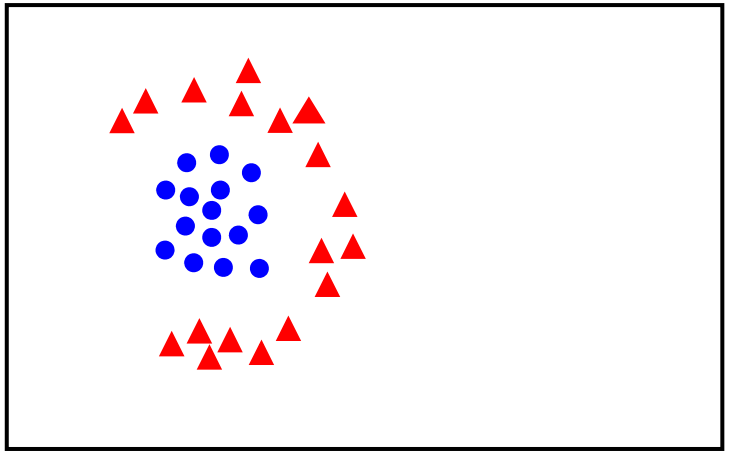
linearly separable



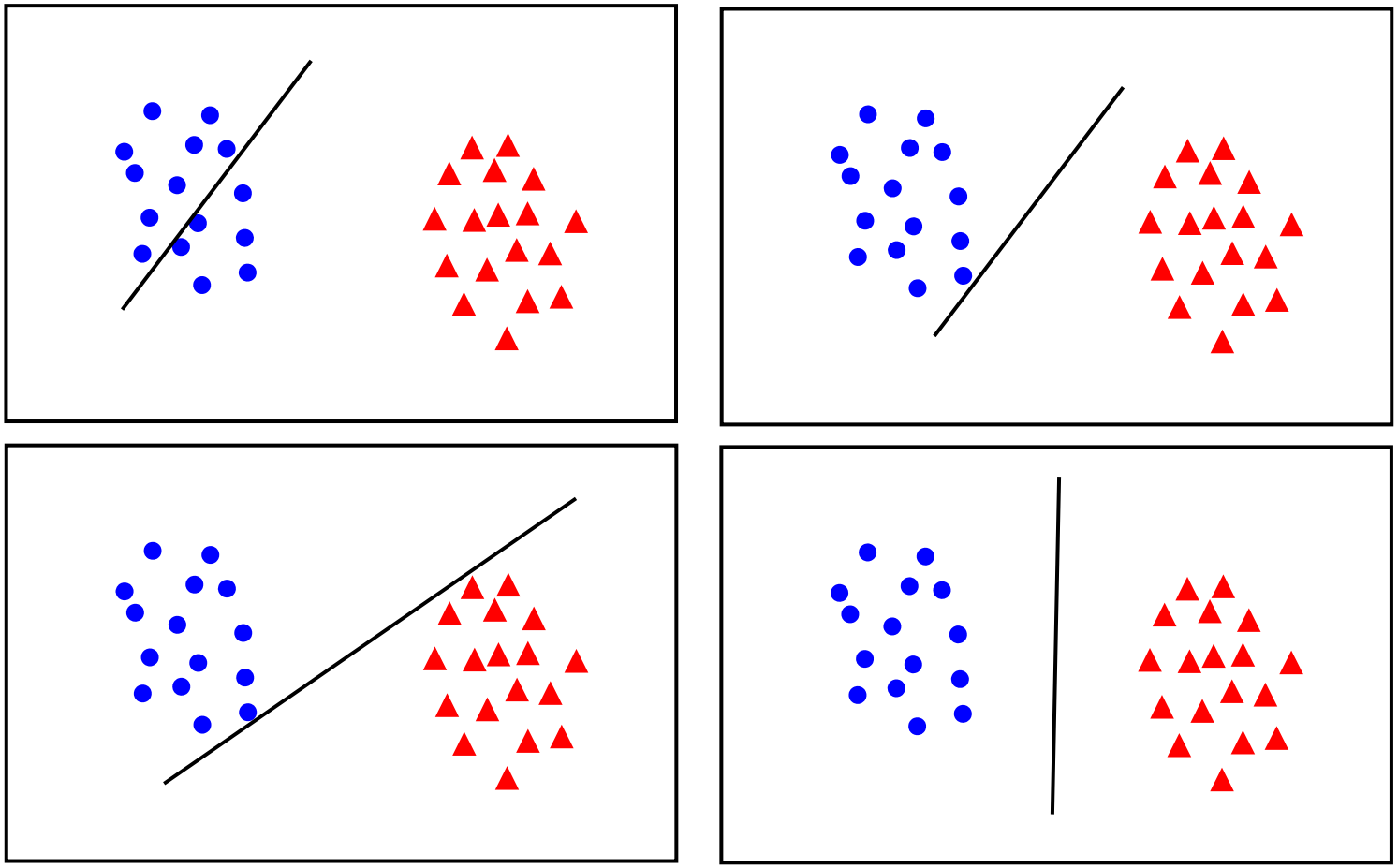


not linearly separable





What is the best w?

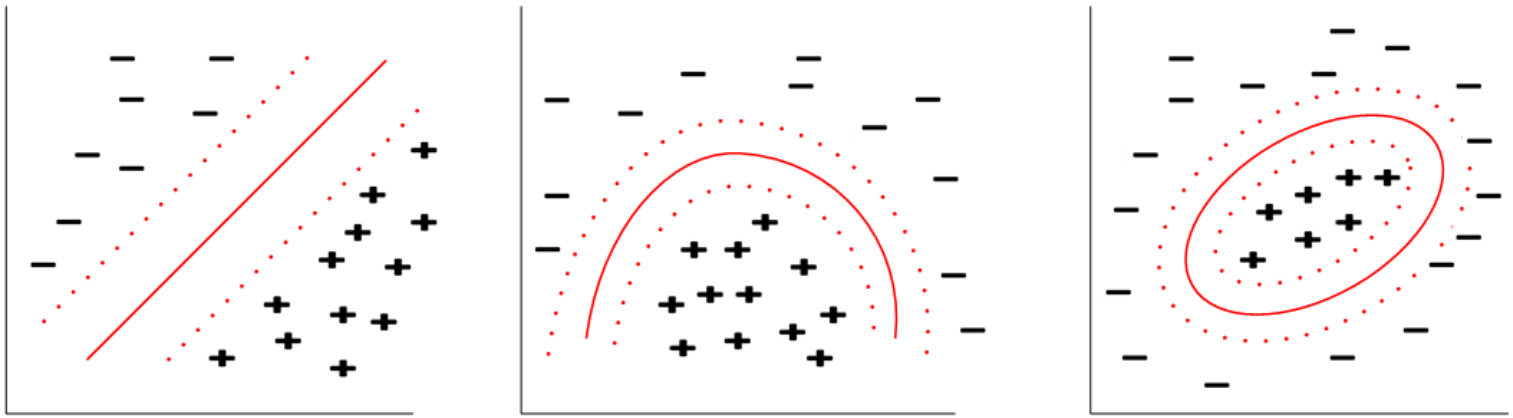


- maximum margin solution: most stable under perturbations of the inputs

Non-Linear SVM

- For understanding this, see Figure 13.
- Note that a linear hyperplane is expressed as a linear equation in terms of *n*-dimensional component, whereas a non-linear hypersurface is a non-linear expression.

Figure 13: 2D view of few class separabilities.



(a) Linear hyperplane (b) Nonlinear hyperplane (c) Nonlinear hypersurface

Linear SVM for Linearly Not Separable Data

Figure 10: Problem with linear SVM for linearly not separable data.