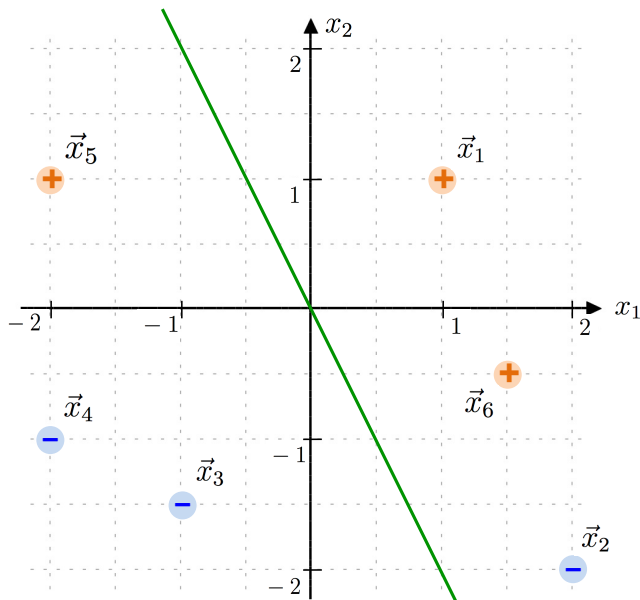


Perceptron Example

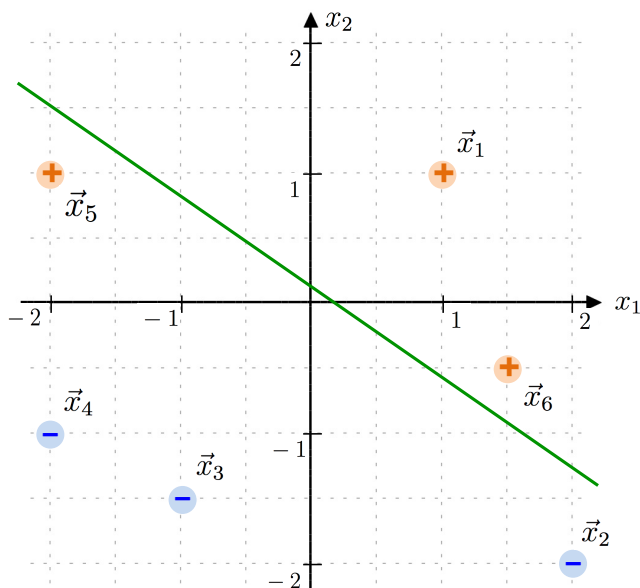
(find and work with a partner)

The example below shows 6 training data points. We wish to find a separating hyperplane using the perceptron algorithm. We will begin with $\vec{w} = [0, 1, 0.5]^T$ and $\alpha = 0.2$. We normally use $\alpha = 1$ so we don't even need to consider it (α only affects the magnitude of \vec{w} , not the classifications), but using a small value here will keep the numbers and graphing more manageable.

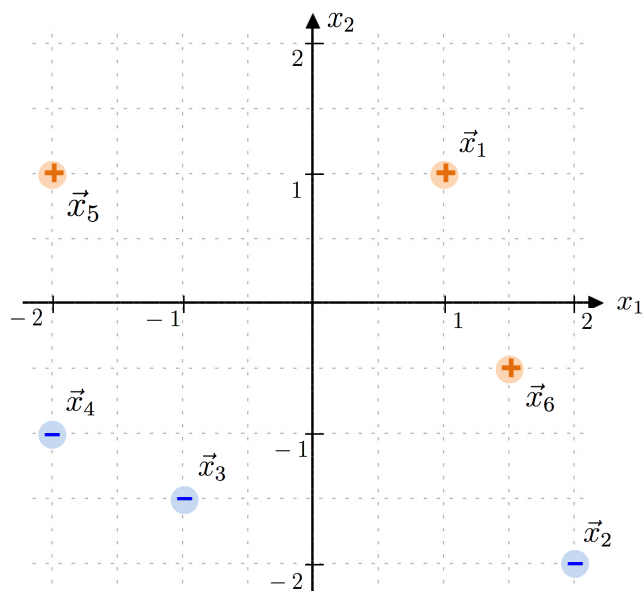
1. Beginning with the plot below, consider the points in order. From \vec{x}_1 and \vec{x}_2 , determine what actions we will take and update the weight vector. Graphically show how the hyperplane is updated.



2. This is what the hyperplane looks like after \vec{x}_1 and \vec{x}_2 . Now consider \vec{x}_3 , \vec{x}_4 , and \vec{x}_5 . What is the weight vector after these points are considered? Sketch out the vector addition on this plot too.



3. Draw the resulting hyperplane from your previous step. Now consider \vec{x}_6 and update the weight vector using this point.



4. Finally, draw the final hyperplane!

