## 2 Solution to Question 2

Quislion 2. To. 
$$h(x) = sign(\| \Phi(x) - C_-\|^2 - \| \Phi(x) - C_+ \|^2)$$
, can be re-written as.

Alow,  $sign(\sum_{i=1}^{m} a_i K(x, x_i) + b)$ .

We know that  $\| \Phi(x) - C_-\|^2 = \langle \Phi(x) - C_-, \Phi(x) - C_- \rangle$ .

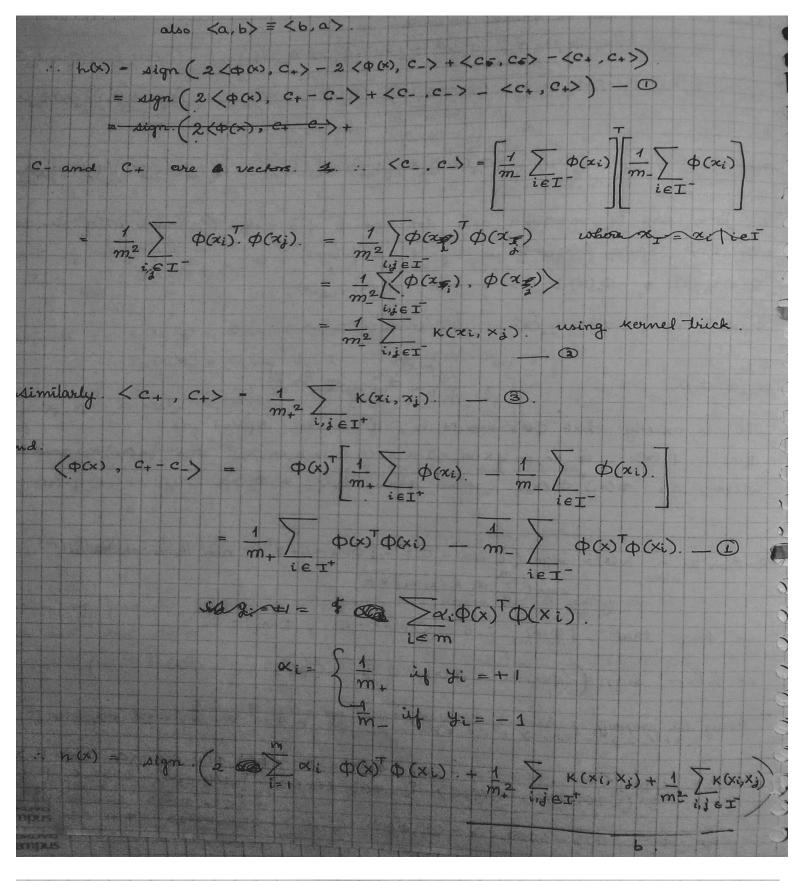
As  $h(x) = sign(\langle \Phi(x) - C_-, \Phi(x) - C_- \rangle - \langle \Phi(x) - C_+, \Phi(x) - C_+ \rangle$ .

Using the property of linearity of inner broduct: according to which .

 $\langle x + y, z \rangle = \langle x, z \rangle + \langle y, z \rangle$ . and  $\langle x, y + z \rangle = \langle x, y \rangle + \langle x, z \rangle$ .

 $h(x) = sign(\langle \Phi(x), \Phi(x) - \langle \Phi(x), C_- \rangle - \langle C_-, \Phi(x) - C_- \rangle - \langle \langle \Phi(x), \Phi(x) - \langle \Phi(x), C_+ \rangle - \langle C_+, \Phi(x) - \langle C_+, \Phi$ 

Continues in next page...



$$f_{i}(x) = sign\left(\frac{1}{2} \cdot \sum_{i=1}^{m} \alpha_{i} \varphi(x)^{T} \varphi(x_{i}) + b\right), \quad b = \frac{1}{2} \sum_{i=1}^{m} k(x_{i}, x_{j}) + \frac{1}{2} \sum_{i=1}^{m} k(x_{i}, x$$