

Input:

C : regularization parameter
 tol : numerical tolerance
 max_passes : max # of times to iterate over α 's without changing
 $(x^{(1)}, y^{(1)}), \dots, (x^{(m)}, y^{(m)})$: training data

Output:

$\alpha \in \mathbb{R}^m$: Lagrange multipliers for solution
 $b \in \mathbb{R}$: threshold for solution

- Initialize $\alpha_i = 0, \forall i, \quad b = 0$.
- Initialize $passes = 0$.

$$f(x) = \langle \omega, x \rangle + b$$

$$\omega = \sum_{i=1}^m \alpha_i y^{(i)} x^{(i)}$$

- **for** $i = 1, \dots, m$,
 - Calculate $E_i = f(x^{(i)}) - y^{(i)}$ using (2).
 - **if** $((y^{(i)} E_i < -tol \quad \&\& \quad \alpha_i < C) \parallel (y^{(i)} E_i > tol \quad \&\& \quad \alpha_i > 0))$