Details of each step can be found in the text book (Chapter 5: Pages 256-276)

Linear Hard margin SVM

Step 1 - model as convex optimization problem with objective fn. and constraints

Step 2 - use Lagrangian Multipliers L_P and conversion to L_D

Step 3 - solution of L_D using quadratic programming

Linear Soft margin SVM

Step 1 - formulation with slack variables

Step 2 - model as convex optimization problem with objective fn. and constraints

Step 3 - use Lagrangian Multipliers L_P and conversion to L_D

Step 4 - solution of L_D using quadratic programming

Non-linear SVM

Step 1 - Transform to higher dimensional space

Step 2 - model as convex optimization problem with objective fn. and constraints

Step 3 - use Lagrangian Multipliers L_P and conversion to L_D

Step 4 - Kernel Trick and solution of L_D using quadratic programming