

```

    end
end

```

The function `buildSVMs3b` builds the constraint matrix and the matrices defining the quadratic program.

```

function [A,c,X,P2,Pa,q] = buildSVMs3b(nu,u,v,K)
% builds the matrix of constraints A for
% soft margin nu-SVM s3 and the right-hand side c
% u: vector of p blue points (each an n-dim vector)
% v: vector of q red points (each an n-dim vector)
% builds the matrix X = [-u_1 ... -u_p v_1 ... v_q]
% and the matrix Xa as 2(p+q) matrix obtained
% by augmenting X'*X with zeros
% K is a scale factor (K = Ks)

p = size(u,2); q = size(v,2);
% Ks = 1/(p+q);
Ks = K; Km = (p+q)*K*nu;
A = [ones(1,p) ones(1,q) zeros(1,p+q) ;
     eye(p) zeros(p,q) eye(p) zeros(p,q);
     zeros(q,p) eye(q) zeros(q,p) eye(q) ];
c = [Km; Ks*ones(p+q,1)];
X = [-u v];
XX1 = X'*X;
XX2 = [ones(p,1)*ones(p,1)' -ones(p,1)*ones(q,1)';
      -ones(q,1)*ones(p,1)' ones(q,1)*ones(q,1)'];
P2 = XX1 + XX2;
Pa = [P2 zeros(p+q,p+q); zeros(p+q, 2*(p+q))];
q = zeros(2*(p+q),1);
end

```

B.4 ν -SV Regression

The main function `donuregb` is given below.

```

function
[lamb,mu,alpha,beta,lambnz,munz,lamK,muK,numsvl1,numsvm1,w,epsilon,b]
    = donuregb (rho,nu,X,y,C)
%
% Soft margin nu-regression
% with the constraint
%  $\sum_{i=1}^m \mu_i + \sum_{j=1}^m \mu_j = C \nu$ 

```