

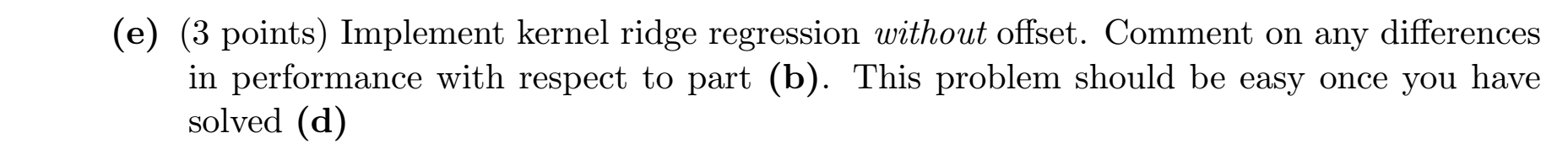
MSE\_training= 28.7940, MSE\_test= 34.1488, b=1.0314

Code for KRR with offset:

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| --- |
| close all; clear all; clc  load bodyfat\_data.mat  n=150;  lambda=3e-3;  d=2;  x\_train=X(1:n,:);  y\_train=y(1:n);  x\_test=X(n+1:end,:);  y\_test=y(n+1:end);  m=numel(y\_test);  xbar=sum(x\_train,1)/n;  ybar=sum(y\_train)/n;  xtilde=x\_train-repmat(xbar,[n 1]);  ytilde=y\_train-ybar;  O=1/n\*ones(n);  for i=1:n  for j=1:n  K(i,j)=gaus\_ker(x\_train(i),x\_train(j));  end  end  Ktilde=K-K\*O-O\*K+O\*K\*O;  yhat\_train=ybar+ytilde'\*(Ktilde+n\*lambda\*eye(n))^-1\*Ktilde;  yhat\_train=yhat\_train';  e\_train=y\_train-yhat\_train;  MSE\_train=sum(e\_train.^2)/98  for i=1:n  for j=1:m  Kprime(i,j)=gaus\_ker(x\_train(i),x\_test(j));  end  end  Onm=1/n\*ones(n,m);  Ktildeprime=Kprime-K\*Onm-O\*Kprime+O\*K\*Onm;  yhat\_test=ybar+ytilde'\*(Ktilde+n\*lambda\*eye(n))^-1\*Ktildeprime;  yhat\_test=yhat\_test';  e\_test=y\_test-yhat\_test;  MSE\_test=sum(e\_test.^2)/98  b=ybar-ybar-ytilde'\*(Ktilde+n\*lambda\*eye(n))^-1\*(1/n\*sum(K,2)-(1/n^2)\*sum(K)\*ones(n,1)) |

Code for calculation of Gaussian kernel:

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| function k=gaus\_ker(u,v)  sigma=1.5;  k=exp(-1/(2\*sigma^2)\*norm(u-v)^2);  end |



MSE\_training=28.8242, MSE\_test=73.9540

Code for KRR without offset:

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| --- |
| close all; clear all; clc  load bodyfat\_data.mat    n=150;  lambda=3e-3;  d=2;    x\_train=X(1:n,:);  y\_train=y(1:n);    xbar=sum(x\_train,1)/n;  ybar=sum(y\_train)/n;    xtilde=x\_train-repmat(xbar,[n 1]);  ytilde=y\_train-ybar;    %%%%%%%%% Ktilde %%%%%%%%  for i=1:n  for j=i:n  sum2=0;  for r=1:n  sum2=sum2+gaus\_ker(x\_train(i),x\_train(r));  end  sum3=0;  for s=1:n  sum3=sum3+gaus\_ker(x\_train(s),x\_train(j));  end  sum45=0;  for r=1:n  for s=1:n  sum45=sum45+gaus\_ker(x\_train(r),x\_train(s));  end  end  Ktilde(i,j)=gaus\_ker(x\_train(i),x\_train(j))-1/n\*sum2-1/n\*sum3+1/n^2\*sum45;  Ktilde(j,i)=Ktilde(i,j);  end  end  %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%    x\_test=X(n+1:end,:);  y\_test=y(n+1:end);    for i=1:numel(y\_test)  yhat\_test(i)=ybar+ytilde'\*(Ktilde+n\*lambda\*eye(n))^-1\*ktilde(x\_test(i));  end  e=y\_test-yhat\_test;  MSE=sum(e.^2)/98 |

