%image zooming

%4-pt scheme

f=double(imread('lena\_256x256.bmp'));

N=size(f,1); %sizeÀúÀå

L=[-1/16 9/16 9/16 -1/16];

y=zeros(1,2\*N-1);

Y=zeros(N,2\*N-1);

for i=1:N

temp=f(i,:);

temp2=[temp(1) temp temp(N)];

for k=1:N-1

y(2\*k-1)=temp(k);

y(2\*k)=[temp2(k) temp2(k+1) temp2(k+2) temp2(k+3)]\*L';

end

y(2\*N-1)=temp(N);

Y(i,:)=y;

end

z=zeros(2\*N-1,1);

Y2=zeros(2\*N-1,2\*N-1);

for j=1:2\*N-1

temp=Y(:,j);

temp2=[temp(1); temp; temp(N)];

for i=1:N-1

z(2\*i-1)=temp(i);

z(2\*i)=[temp2(i) temp2(i+1) temp2(i+2) temp2(i+3)]\*L';

end

z(2\*N-1)=temp(N);

Y2(:,j)=z;

end

%4¹è!ÇÑ¹ø´õµ¹¸®±â

N=size(Y2,1);

y=zeros(1,2\*N-1);

Y=zeros(N,2\*N-1);

for i=1:N

temp=Y2(i,:);

temp2=[temp(1) temp temp(N)];

for k=1:N-1

y(2\*k-1)=temp(k);

y(2\*k)=[temp2(k) temp2(k+1) temp2(k+2) temp2(k+3)]\*L';

end

y(2\*N-1)=temp(N);

Y(i,:)=y;

end

z=zeros(2\*N-1,1);

Y3=zeros(2\*N-1,2\*N-1);

for j=1:2\*N-1

temp=Y(:,j);

temp2=[temp(1); temp; temp(N)];

for i=1:N-1

z(2\*i-1)=temp(i);

z(2\*i)=[temp2(i) temp2(i+1) temp2(i+2) temp2(i+3)]\*L';

end

z(2\*N-1)=temp(N);

Y3(:,j)=z;

end

figure;

subplot(1,3,1);imagesc(Y3);colormap gray; axis image;

title('zoom in by 4pt-scheme x4'); axis([0,1022,0,1022]);

subplot(1,3,2);imagesc(Y2);colormap gray; axis image;

title('zoom in by 4pt-scheme x2'); axis([0,1022,0,1022]);

subplot(1,3,3);imagesc(f);colormap gray;axis image;

title('Original image'); axis([0,1022,0,1022]);