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| 学 院：电子信息工程学院 | 实验名称： 实验四 线性卷积与循环卷积 | |
| 班 级： | 实验时间：2023.6.9 | 成 绩： |
| 姓 名： | 教师评语： | |
| 学 号： |

1. 实验目的

二.实验原理

三.实验内容

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| %1  % Define the sequences  n = 0:3;  RN=(n>=0)&(n<4);  x = (n+1).\*RN;  h = (4-n).\*RN;  % Compute the linear convolution  y = conv(x, h);  stem(0:length(y)-1, y);  xlabel('n');  ylabel('y(n)');  title('Linear Convolution of x(n) and h(n)');  % Compute the circular convolutions  yc5=circonv([x,0],[h,0]);  yc6=circonv([x,0,0],[h,0,0]);  yc7=circonv([x,0,0,0],[h,0,0,0]);  yc8=circonv([x,0,0,0,0],[h,0,0,0,0]);  figure;  subplot(221);stem(0:4,yc5);title('x(n)⑤h(n)');  subplot(222);stem(0:5,yc6);title('x(n)⑥h(n)');  subplot(223);stem(0:6,yc7);title('x(n)⑦h(n)');  subplot(224);stem(0:7,yc8);title('x(n)⑧h(n)');  % Compute the circular convolution using  % FFT and IFFT  N = 8;  X = fft(x, N);  H = fft(h, N);  Y = ifft(X.\*H);  figure  stem(0:7, Y);  xlabel('n');  ylabel('x(n)⑧h(n)');  title('Circular Convolution of x(n) and h(n) using FFT and IFFT');  %%  function y=circonv(x1,x2)  xn2=[x2(1),fliplr(x2)];  xn2(length(xn2))=[];  C=xn2;  R=x2;  M=toeplitz(C,R);  y=x1\*(M);  end |  |
| %2  hn = [-0.014534,0.006316,0.049630,0.030960,-0.064914,-0.065690,0.161875,0.432748,0.432748,0.161875,-0.065690,-0.064914,0.030960,0.049630,0.006316,-0.014534];  n = 0:999;k = 1:128;m = 0:15;  xn = 0.9.^n + cos(0.25\*pi\*n) + sin(0.75\*pi\*n);  x1n = [zeros(1,15),xn(1:113)];x2n = xn(99:226);x3n = xn(212:339);  x4n = xn(325:452);x5n = xn(438:565);x6n = xn(551:678);  x7n = xn(664:791);x8n = xn(777:904);x9n = [xn(890:1000),zeros(1,17)];  Hn = [hn,zeros(1,128-16)];Y = zeros(9,128);  for i = 1:9  XiN = fft(eval(['x',num2str(i),'n']),128);  Y(i,:) = ifft(XiN.\*fft(Hn,128));  end  yn\_overlap\_save = Y(:,16:128)';  yn\_overlap\_save\_1000 = yn\_overlap\_save(1:1000);  figure(1);  subplot(2,1,1);stem(n,xn,'.');xlabel('n');ylabel('x(n)');  subplot(2,1,2);stem(m,hn,'.');xlabel('n');ylabel('h(n)');axis([-1 16 -0.1 0.5]);  figure(2);  stem(n,yn\_overlap\_save\_1000,'.');xlabel('n');ylabel('y(n)');title('重叠保留法');  figure;  y = fftfilt(hn, xn, 32);  stem(0:999, y,'.');xlabel('n');ylabel('y(n)'); |  |

四.实验总结