**云南大学资源环境与地球科学学院**

**《 地震数字信号处理 》课程实验报告**

**实验序号 08 实验名称 序列的圆周运算 指导教师 杨海燕老师**

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| **请实验指导教师根据实验情况，自行选择以下内容进行填写并留适当空白** | **成绩** |
| * **实验目的（必填）**   **熟悉序列的圆周运算**   * **实验原理（请用自己的语言简明扼要地叙述）**   **利用线性卷积与圆周卷积运算之间的关系可简便计算出圆周卷积**   * **实验内容与数据来源（简明写出实验方法、关键步骤和要测量的参数）**   **1，x(n)={1,0,2,1,3},n属于0~4,求x(n)和自己的卷积，N=5的与自己的圆周卷积；N=10，与自己的圆周卷积。**  **2，x(n)={1,2,4,3,0,5},n属于0~5，求x(n)的DFT，即X(k)。**   * **程序代码（必填）**   **第一题**  **fortran：**  program ex08   * integer,dimension(5)::a=(/1,0,2,1,3/) * integer,dimension(9)::b=0 * integer,dimension(10)::c=0 * integer::i=1,j=1 * do i=1,5 * do j=1,5 * b(i+j-1)=b(i+j-1)+a(i)\*a(j) * enddo * enddo * open(1,file='X.data',status='replace') * do i=0,4 * write(1,'(3I3)') i,a(i+1),a(i+1) * enddo * close(1) * a=0 * do i=0,8 * a(modulo(i,5)+1)=a(modulo(i,5)+1)+b(i+1) * enddo * open(1,file='XX.data',status='replace') * do i=1,9 * write(1,'(3I3)') i-1,b(i),b(i) * enddo * close(1) * open(1,file='XX5.data',status='replace') * do i=1,5 * write(1,'(3I3)') i-1,a(i),a(i) * enddo * close(1) * do i=0,8 * c(modulo(i,10)+1)=c(modulo(i,10)+1)+b(i+1) * enddo * open(1,file='XX10.data',status='replace') * do i=1,10 * write(1,'(3I3)') i-1,c(i),c(i) * enddo * close(1) * end program ex08   **GMT：**  #!/usr/bin/env -S bash -e   * # GMT modern mode bash template * # Date: 2022-05-17T16:39:58 * # User: sirius * # Purpose: Purpose of this script * export GMT\_SESSION\_NAME=$$ # Set a unique session name * gmt begin T1 png/pdf * # Place modern session commands here * #gmt set FONT\_LABEL 12p,ZapfDingbats * gmt subplot begin 4x1 -Ff30c/50c * gmt subplot set 0 * gmt plot -Sb0.1cb0 -JX25c/10c -R0/11/0/15 X.data -Gblack -BWS -Bx+l'n' -By+l'X(n)' * gmt plot -Sc0.3c -JX25c/10c X.data -Gblack * gmt text -JX25c/10c -D1/1 -F+f30p X.data * gmt subplot set 1 * gmt plot -Sb0.1cb0 -JX25c/10c -R0/11/0/15 XX.data -Gblack -BWS -Bx+l'n' -By+l'X(n)\*X(n)' * gmt plot -Sc0.3c -JX25c/10c XX.data -Gblack * gmt text -JX25c/10c -D1/1 -F+f30p XX.data * gmt subplot set 2 * gmt plot -Sb0.1cb0 -JX25c/10c -R0/11/0/15 XX5.data -Gblack -BWS -Bx+l'n' -By+l'X(n) X(n)' * gmt basemap -JX25c/10c -R0/11/0/15 -BWS -By+l'\260' --FONT\_LABEL=ZapfDingbats * gmt plot -Sc0.3c -JX25c/10c XX5.data -Gblack * gmt text -JX25c/10c -D1/1 -F+f30p XX5.data * gmt subplot set 3 * gmt plot -Sb0.1cb0 -JX25c/10c -R0/11/0/15 XX10.data -Gblack -BWS -Bx+l'n' -By+l'X(n) X(n)' * gmt basemap -JX25c/10c -R0/11/0/15 -BWS -By+l'\265' --FONT\_LABEL=ZapfDingbats * gmt plot -Sc0.3c -JX25c/10c XX10.data -Gblack * gmt text -JX25c/10c -D1/1 -F+f30p XX10.data * gmt subplot end * gmt end show   **第二题：**  **fotran：**  program ex09   * complex(kind=4)::a * integer,dimension(6)::x=(/1,2,4,3,0,5/) * complex,dimension(6)::Xa=(0,0) * real::PI=3.14159,k * integer::i,j * do i=0,5 * do j=0,5 * Xa(i+1)=Xa(i+1)+x(j+1)\*complex(cos(2\*PI/6\*i\*j),-sin(2\*PI/6\*i\*j)) * enddo * enddo * a=complex(10,1\*10) * write(\*,'(f8.3,f8.3)') real(a),aimag(a) * open(1,file='X2.data',status='replace') * do i=1,6 * k=sqrt(real(Xa(i))\*\*2+aimag(Xa(i))\*\*2) * write(1,'(i3,f8.3,f8.3)') i-1,k,k * enddo * close(1) * open(1,file='X22.data',status='replace') * do i=1,6 * write(1,'(3i3)') i-1,x(i),x(i) * enddo * close(1) * end program ex09   **GMT：**  #!/usr/bin/env -S bash -e   * # GMT modern mode bash template * # Date: 2022-05-19T23:12:38 * # User: sirius * # Purpose: Purpose of this script * export GMT\_SESSION\_NAME=$$ # Set a unique session name * gmt begin T82 png/pdf * # Place modern session commands here * gmt subplot begin 2x1 -Ff30c/25c * gmt subplot set 0 * #gmt text -R-1/6/0/18 -D1/0.1 X22.data * gmt plot -Sb0.1cb0 -R-1/6/0/18 -JX30c/10c X22.data -Gblack -BWS -Bx+l'n' -By+l'x(n)' * gmt plot -Sc0.2c -JX30c/10c X22.data -Gblack * gmt text -D0.5/0.5 X22.data -F+f20p * gmt subplot set 1 * #gmt text -R-1/6/0/18 -JX30c/10c -D1/1 X2.data -F+f20p * gmt plot -Sb0.1cb0 -R-1/6/0/18 -JX30c/10c X2.data -Gblack -BWS -Bx+l'k' -By+l'X(k)' * gmt plot -Sc0.2c -JX30c/10c X2.data -Gblack * gmt text -JX30c/10c -D0.5/0.5 X2.data -F+f20p * gmt subplot end * gmt end show * **实验结论（必填）**   **第一题：**  **第二题：**   * **实验体会及建议、思考**   利用圆周卷积和线性卷积之间的联系可以较为简便地计算圆周卷积。 |  |