

PROGRAM PERTAMA

REM PERHITUNGAN FUNGSI AUTOKOVARIAN
REM DENGAN METODE TFC FORMULASI COOLEY-TUKEY UNTUK $N=2^t$

CLS
COLOR 9: INPUT "PANGKAT DUA DARI N : ";NU%
N% = 2^NU%
DIM X(N%), XREAL(N%), XIMAG(N%)
OPTION BASE 0
PRINT : PRINT TAB(5) "PEMASUKKAN DATA X(J) : "

```
FOR J% = 1 TO N%  
  I% = J% - 1  
  COLOR 13  
  PRINT : PRINT TAB(10) "NILAI X(" ; I% ; ") : "  
  PRINT TAB(16) "XREAL(" ; I% ; ") : "  
  INPUT XREAL(J%)  
  XREAL1(J%) = XREAL(J%)  
  PRINT TAB(16) "XIMAG(" ; I% ; ") : "  
  INPUT XIMAG(J%)  
  XEIMAG1(J%) = XIMAG(J%)  
  Xe(J%) = XREAL1(J%) + XEIMAG1(J%)  
NEXT J%
```

GOSUB 10

```
FOR I% = 1 TO N%  
  XERREAL2(I%) = XREAL(I%) / N%  
  XEIMAG2(I%) = XIMAG(I%) / N%  
  SQRAe(I%) = XERREAL2(I%)^2 + XEIMAG2(I%)^2  
NEXT I%
```

```
FOR J% = 1 TO N%  
  XREAL(J%) = SQRAe(J%)  
  XIMAG(J%) = 0  
NEXT J%
```

GOSUB 10

```
FOR I% = 1 TO N%  
  J% = I% - 1  
  SUM(I%) = XREAL(I%) + XIMAG(I%)  
  TOT(I%) = SUM(I%) * N%  
NEXT I%
```

COLOR 13

CLS

PRINT " PERHITUNGAN FUNGSI AUTOKOVARIAN "
PRINT " DENGAN METODE TFC FORMULASI COOLEY-TUKEY UNTUK $N=2^t$ "

PRINT

COLOR 15 : PRINT STRING\$(59,205)

COLOR 14

PRINT " J"; TAB(6) "Xe(J)"; TAB(20) "Ae(N)";

PRINT TAB(39) " |Ae(N)|"; TAB(53) "Zxx(k) "

COLOR 15 : PRINT STRING\$(59,205)

```
FOR I% = 1 TO N%  
  J% = I% - 1  
  PRINT TAB(1); J%; TAB(7); Xe(I%); TAB(12);  
  PRINT USING "## #####"; XERREAL2(I%);  
  IF XEIMAG2(I%) < 0 THEN 15  
  PRINT " + "; TAB(23); GOTO 22
```

PROGRAM PERTAMA

```

15 XEIMAG2(I%)=XEIMAG2(I%)*-1:PRINT "- ";
22 PRINT USING "##.#####";XEIMAG2(I%);
PRINT " ";TAB(37);
PRINT USING "##.#####";SQRAc(I%);TAB(50);
PRINT USING "##.#####";TOT(I%)
NEXT I%

PRINT STRING$(59,205)
INPUT "":A$

CLS
COLOR 15
PRINT:PRINT "FUNGSI AUTOKOVARIANNYA YAITU : "
PRINT STRING$(50,196)
COLOR 23 : PRINT:PRINT " UNTUK k = 0 ";
M%=N%/2

FOR K%=1 TO M%-1
PRINT " ";K%;
NEXT K%

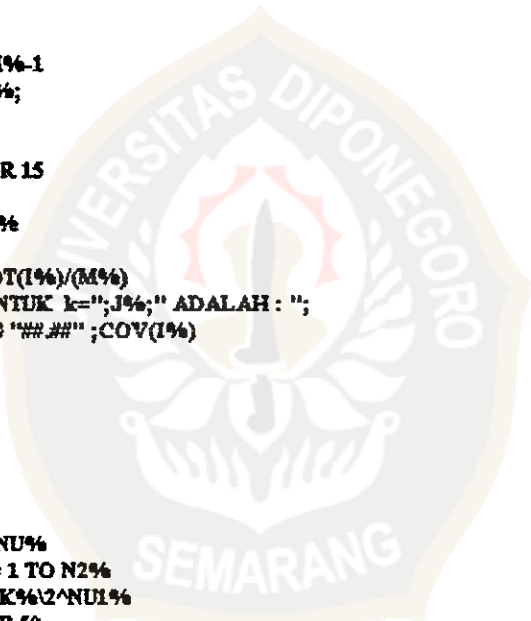
PRINT:PRINT : COLOR 15

FOR I%=1 TO M%
J%=I% - 1
COV(I%)=TOT(I%)/(M%)
PRINT " UNTUK k=";J%;" ADALAH : ";
PRINT USING "##.###";COV(I%)
NEXT I%
INPUT "":Q$
END

10 N2% = N%/2
NU1% = NU% - 1
K% = 0
FOR L% = 1 TO NU%
20 FOR I% = 1 TO N2%
J% = K%2*NU1%
GOSUB 50
ARG = 6.283185# * IBITR% / N%
C = COS(ARG)
S = SIN(ARG)
K1% = K% + 1
KIN2% = K1% + N2%
TREAL = XREAL(KIN2%) * C + XIMAG(KIN2%) * S
TIMAG = XIMAG(KIN2%) * C - XREAL(KIN2%) * S
XREAL(KIN2%) = XREAL(K1%) - TREAL
XIMAG(KIN2%) = XIMAG(K1%) - TIMAG
XREAL(K1%) = XREAL(K1%) + TREAL
XIMAG(K1%) = XIMAG(K1%) + TIMAG
K% = K% + 1
NEXT I%
K% = K% + N2%
IF K% < N% GOTO 20
K% = 0
NU1% = NU1% - 1
N2% = N2% / 2
NEXT L%

FOR K% = 1 TO N%
J% = K% - 1
GOSUB 50

```



PROGRAM PERTAMA

```
1% = IBITR% + 1
IF (1% <= K%) GOTO 30
TREAL = XREAL(K%)
TIMAG = XIMAG(K%)
XREAL(K%) = XREAL(1%)
XIMAG(K%) = XIMAG(1%)
XREAL(1%) = TREAL
XIMAG(1%) = TIMAG
30 NEXT K%
RETURN
END

50 J1% = J%
IBITR% = 0
FOR I1% = 1 TO NU%
  J2% = J1% \ 2
  IBITR% = IBITR% * 2 + (J1% - 2 * J2%)
  J1% = J2%
NEXT I1%
RETURN
END
```



PROGRAM KEDUA

REM PROGRAM MENGHITUNG PENGHALUSAN PERIODOGRAM
REM DENGAN METODE TFC FORMULASI COOLEY-TUKEY UNTUK $N = 2^T$

```
CLS
COLOR 9 : PRINT TAB(5) "PANGKAT DUA DARI N : ";
INPUT NU% : PRINT NU%
PRINT TAB(5) "MASUKKAN HARGA K : ";
INPUT K : PRINT K
PRINT TAB(5) STRING$(24,196)
N% = 2^NU%
DIM X(N%), XREAL(N%), XIMAG(N%), TOT(N%), PER(N%+10), PPER(N%)
OPTION BASE 0
PHI = 3.14
COLOR 13 : PRINT : PRINT TAB(7) "TEMASUKKAN DATA X(J) : "

FOR J% = 1 TO N%
    PRINT : PRINT TAB (10) "NILAI X(";J%;") : "
    PRINT TAB(15) "XREAL(";J%;") : ";
    INPUT XREAL(J%)
    X(J%)=XREAL(J%)
    PRINT TAB(15) "XIMAG(";J%;") : ";
    INPUT XIMAG(J%)
NEXT J%

GOSUB 10

CLS
COLOR 13
PRINT
PRINT TAB(12) "PERHITUNGAN PENGHALUSAN PERIODOGRAM UNTUK  $N = 2^T$ "
COLOR 15 : PRINT STRING$(71,205)
COLOR 14 : PRINT " J "; X(J); TAB(20); "A(N)"; TAB(35); "|A(N)|";
PRINT TAB(52); "I(w)"; TAB(65); "P(w)"
COLOR 15 : PRINT STRING$(71,205)

FOR I% = 1 TO N%
    TOT(I%)=XREAL(I%)^2+XIMAG(I%)^2
    PER(I%)=TOT(I%)/N%
    FOR L% = 2 TO N%/2
        PER(N%/2+L%) = PER(N%/2-L%+2)
    NEXT L%
    PER(0)=PER(N%)
    PER(N%+1)=PER(1)
    JUM=0
    FOR J% = -K TO K
        JUM=JUM+PER(I%+(J%+K-1))
    NEXT J%
    PPER(I%)=(1/(2*PHI))*(1/((2*K+1)))^JUM
    PPER(2)=PPER(N%)
NEXT I%

FOR I% = 1 TO N%
    PRINT USING "###";I%;
    PRINT USING " ###";X(I%);
    PRINT USING " #######";XREAL(I%);
    IF XIMAG(I%) < 0 THEN 15
    PRINT " +";GOTO 22
15 XIMAG(I%)=XIMAG(I%)*-1:PRINT " -";
22 PRINT USING "#######";XIMAG(I%);
    PRINT " I";
```

PROGRAM KEDUA

```

PRINT USING " ###.#####";TOT(I%);
PRINT USING " ##.#####";PER(I%);
PRINT USING " ##.#####";PPER(I%)
NEXT I%
PRINT STRING$(71,205)
INPUT "";Q$
END

10 N2% = N%/2
NU1% = NU% - 1
K% = 0
FOR L% = 1 TO NU%
20 FOR I% = 1 TO N2%
J% = K%^2^NU1%
GOSUB 50
ARG = 6.283185# * IBITR% / N%
C = COS(ARG)
S = SIN(ARG)
K1% = K% + 1
KIN2% = K1% + N2%
TREAL = XREAL(KIN2%) * C + XIMAG(KIN2%) * S
TIMAG = XIMAG(KIN2%) * C - XREAL(KIN2%) * S
XREAL(KIN2%) = XREAL(K1%) - TREAL
XIMAG(KIN2%) = XIMAG(K1%) - TIMAG
XREAL(K1%) = XREAL(K1%) + TREAL
XIMAG(K1%) = XIMAG(K1%) + TIMAG
K% = K% + 1
NEXT I%
K% = K% + N2%
IF K% < N% GOTO 20
K% = 0
NU1% = NU% - 1
N2% = N2% / 2
NEXT L%

FOR K% = 1 TO N%
J% = K% - 1
GOSUB 50
I% = IBITR% + 1
IF (I% <= K%) GOTO 30
TREAL = XREAL(K%)
TIMAG = XIMAG(K%)
XREAL(K%) = XREAL(I%)
XIMAG(K%) = XIMAG(I%)
XREAL(I%) = TREAL
XIMAG(I%) = TIMAG
30 NEXT K%
RETURN
END

50 J1% = J%
IBITR% = 0
FOR J2% = 1 TO NU%
J2% = J1%^2
IBITR% = IBITR% * 2 + (J1% - 2 * J2%)
J1% = J2%
NEXT J2%
RETURN
END □

```

