Lampiran 1

Diketahui

$$Y = A_o + \sum_{k=1}^{16} \left(A_k \text{ Cos } \frac{2\Pi kx}{32} + B_k \text{ Sin } \frac{2\Pi kx}{32} \right) \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{ I}$$

untuk x = o ------> didapat Y_o

x = 1 ------> didapat Y_1

⋮

x = i ------> didapat Y_i

⋮

x = 31 ------> didapat Y_{31}

Sehingga persamaan di atas dapat ditulis sebagai berikut :

$$Y_1 = A_o + \sum_{k=1}^{16} \left(A_k \text{ Cos } \frac{2\Pi ki}{32} + B_k \text{ Sin } \frac{2\Pi ki}{32} \right)$$

untuk i = 0, 1, 2, ..., 31

Atau bisa juga dituliskan :

$$Y_1 = A_o + \sum_{k=1}^{16} C_k \text{ Sin } \left(\frac{2\Pi ki}{32} + \varnothing_k \right)$$

untuk i = 0, 1, 2, ..., 31

Dari persamaan I didapat 33 konstanta yaitu :

$A_o, A_1, A_2, \ldots, A_{16}$ & $B_1, B_2, \ldots, B_{16}$

Cukup banyak untuk suatu fungsi trigonometri yang melalui 32 titik.

Khusus untuk A_o hanya dihitung melalui Y_i, sehingga secara langsung bisa diketahui melalui eksperimen.

$$Y_1 = A_o + \sum_{k=1}^{16} \left(A_k \operatorname{Cos} \frac{2\Pi ki}{32} + B_k \operatorname{Sin} \frac{2\Pi ki}{32} \right)$$

$$\sum_{i=o}^{31} Y_1 = 32\, A_o + \sum_{i=o}^{31} \sum_{k=1}^{16} \left(A_k \operatorname{Cos} \frac{2\Pi ki}{32} + B_k \operatorname{Sin} \frac{2\Pi ki}{32} \right)$$

$$= 32\, A_o + \sum_{k=1}^{16} \left(A_k \sum_{i=o}^{31} \operatorname{Cos} \frac{2\Pi ki}{32} + B_k \sum_{i=o}^{31} \operatorname{Sin} \frac{2\Pi ki}{32} \right)$$

Sedangkan

$$\sum_{i=o}^{31} \operatorname{Cos} \frac{2\Pi ki}{32} = \frac{\operatorname{Sin} \Pi k \,.\, \operatorname{Cos} \frac{31}{32} \Pi k}{\operatorname{Sin} \frac{\Pi k}{32}} = 0$$

$$\sum_{i=o}^{31} \operatorname{Sin} \frac{2\Pi ki}{32} = \frac{\operatorname{Sin} \Pi k \,.\, \operatorname{Cos} \frac{15}{16} \Pi k - \frac{1}{2} \operatorname{Sin} 2\Pi k}{2 \left(\operatorname{Sin} \frac{\Pi k}{32} \right)^2} = 0$$

$$\longrightarrow \quad \sum_{i=o}^{31} Y_1 = 32\, A_o \quad \longrightarrow \quad \boxed{A_o = \frac{1}{32} \sum_{i=o}^{31} Y_1}$$

$$Y_1 = A_o + \sum_{k=1}^{16} \left(A_k \operatorname{Cos} \frac{2\Pi ki}{32} + B_k \operatorname{Sin} \frac{2\Pi ki}{32} \right)$$

Kalikan ke 2 ruas dengan $\operatorname{Cos} \frac{2\Pi mi}{32}$ $(k = m)$

$$Y_1 \cos \frac{2\Pi mi}{32} = A_o \cos \frac{2\Pi mi}{32} + \sum_{k=1}^{16} \left(A_k \cos \frac{2\Pi ki}{32} + B_k \sin \frac{2\Pi mi}{32} \right.$$

$$\left. + B_k \sin \frac{2\Pi ki}{32} \cdot \cos \frac{2\Pi mi}{32} \right)$$

Kemudian dijumlahkan melalui indeks i dengan k = m

$$\longrightarrow \sum_{i=o}^{31} Y_1 \cos \frac{2\Pi mi}{32} = A_o \sum_{i=o}^{31} \cos \frac{2\Pi mi}{32} \Big) +$$

$$\sum_{k=1}^{16} \left(A_m \sum_{i=o}^{31} \cos \frac{2\Pi ki}{32} \cdot \cos \frac{2\Pi mi}{32} + B_m \sum_{i=o}^{31} \sin \frac{2\Pi ki}{32} \cdot \cos \frac{2\Pi mi}{32} \right)$$

Sedang diketahui

$$\sum_{i=o}^{31} \cos \frac{2\Pi mi}{32} = \frac{\sin \Pi m \cdot \cos \frac{31}{32} \Pi m}{\sin \frac{\Pi k}{32}} = 0$$

$$\sum_{i=o}^{31} \cos \frac{2\Pi ki}{32} \cdot \cos \frac{2\Pi mi}{32} = \frac{1}{2} \sum_{i=o}^{31} \left(1 + \cos \frac{2\Pi ki}{16} \right) \quad \text{untuk } k = m$$

$$= \frac{1}{2} \left(32 + \sum_{i=o}^{31} \cos \frac{2\Pi ki}{16} \right)$$

$$= 16 + \frac{1}{2} \cdot \frac{\sin 2\Pi k \cdot \cos \frac{31}{16} \Pi k}{\sin \frac{\Pi k}{16}} = 16$$

$$\sum_{i=o}^{31} \text{Sin } \frac{2\Pi ki}{32} \cdot \text{Cos } \frac{2\Pi mi}{32} = \frac{1}{2} \sum_{i=o}^{31} \text{Sin } \frac{2\Pi ki}{16} \qquad \text{untuk } k = m$$

$$= \frac{1}{2} \left(\frac{\text{Sin } 2\Pi k \cdot \text{Cos } \frac{15}{8} \Pi k - \text{Sin } 4\Pi k}{2 \left(\text{Sin } \frac{\Pi k}{16} \right)^2} \right) = 0$$

Sehingga didapat

$$\sum_{i=o}^{31} Y_1 \text{ Cos } \frac{2\Pi mi}{32} = A_m \cdot 16 \quad \longrightarrow \quad A_k \cdot 16 = \sum_{i=o}^{31} Y_1 \text{ Cos } \frac{2\Pi ki}{32}$$

$$\longrightarrow \quad \boxed{A_k = \frac{1}{16} \sum_{i=o}^{31} Y_1 \text{ Cos } \frac{2\Pi ki}{32}} \qquad k = 1, 2, \ldots, 15$$

$$Y_1 = A_o + \sum_{k=1}^{16} \left(A_k \text{ Cos } \frac{2\Pi ki}{32} + B_k \text{ Sin } \frac{2\Pi ki}{32} \right)$$

Kalikan ke 2 ruas dengan $\text{Sin } \frac{2\Pi mi}{32}$ $\quad (k = m)$

$$Y_1 \text{ Sin } \frac{2\Pi mi}{32} = A_o \text{ Sin } \frac{2\Pi mi}{32} + \sum_{k=1}^{16} \left(A_k \text{ Cos } \frac{2\Pi ki}{32} + \text{Sin } \frac{2\Pi mi}{32} \right.$$

$$\left. + B_k \text{ Sin } \frac{2\Pi ki}{32} \cdot \text{Sin } \frac{2\Pi mi}{32} \right)$$

Kemudian dijumlahkan melalui indeks i dengan k = m

$$\sum_{i=o}^{31} Y_1 \text{ Sin } \frac{2\Pi mi}{32} = A_o \sum_{i=o}^{31} \text{Sin } \frac{2\Pi mi}{32} +$$

$$\sum_{k=1}^{16} \left(A_m \sum_{i=o}^{31} \text{Cos } \frac{2\Pi ki}{32} \cdot \text{Sin } \frac{2\Pi mi}{32} + B_m \sum_{i=o}^{31} \text{Sin } \frac{2\Pi ki}{32} \cdot \text{Sin } \frac{2\Pi mi}{32} \right)$$

Sedang diketahui

$$\sum_{i=o}^{31} \text{Sin } \frac{2\Pi mi}{32} = \frac{\text{Sin } \Pi m \cdot \text{Cos } \frac{15}{16} \Pi m - \frac{1}{2} \text{ Sin } 2\Pi m}{2 \left(\text{Sin } \frac{\Pi m}{32} \right)^2} = 0$$

$$\sum_{i=o}^{31} \text{Cos } \frac{2\Pi ki}{32} \cdot \text{Sin } \frac{2\Pi mi}{32} = \sum_{i=o}^{31} \frac{1}{2} \text{ Sin } \frac{2\Pi mi}{16} \qquad \text{untuk } k = 0$$

$$= \frac{1}{2} \frac{\text{Sin } 2\Pi k \cdot \text{Cos } \frac{15}{8} \Pi k - \text{Sin } 4\Pi k}{2 \left(\text{Sin } \frac{\Pi k}{16} \right)^2} = 0$$

$$\sum_{i=o}^{31} \text{Sin } \frac{2\Pi ki}{32} \cdot \text{Sin } \frac{2\Pi mi}{32} = \sum_{i=o}^{31} \left(\text{Sin } \frac{2\Pi ki}{32} \right)^2 \qquad \text{untuk } k = m$$

$$\sum_{i=o}^{31} \frac{1}{2} \left(1 - \text{Cos } \frac{2\Pi ki}{16} \right)$$

$$= 16 - \frac{1}{2} \sum_{i=o}^{31} \text{Cos } \frac{2\Pi ki}{16}$$

$$= 16 - \frac{1}{2} \cdot \frac{\text{Sin } 2\Pi k \cdot \text{Cos } \frac{31}{16}\Pi k}{\text{Sin } \frac{\Pi k}{16}} = 16$$

$$\longrightarrow \sum_{i=o}^{31} Y_1 \text{ Sin } \frac{2\Pi mi}{32} = B_m \cdot 16$$

$$\longrightarrow B_k \cdot 16 = \sum_{i=o}^{31} Y_1 \text{ Sin } \frac{2\Pi ki}{32}$$

$$\longrightarrow \boxed{B_k = \frac{1}{16} \sum_{i=o}^{31} Y_1 \text{ Sin } \frac{2\Pi ki}{32}} \qquad k = 1,\ 2,\ 3,\ \ldots,\ 15$$

untuk $k = 16 \longrightarrow B_k = \frac{1}{16} \sum_{i=o}^{31} Y_1 \text{ Sin } \Pi i,$

karena $\text{Sin } \Pi i = 0 \longrightarrow \boxed{B_{16} = 0}$

$$Y_1 = A_o + \sum_{k=1}^{16} \left(A_k \text{ Cos } \frac{2\Pi ki}{32} + B_k \text{ Sin } \frac{2\Pi ki}{32} \right)$$

$$= A_o + \sum_{k=1}^{15} \left(A_k \text{ Cos } \frac{2\Pi ki}{32} + B_k \text{ Sin } \frac{2\Pi ki}{32} \right) +$$

$A_{16} \text{ Cos } \Pi i + B_{16} \text{ Sin } \Pi i$

$$\longrightarrow Y_1 = A_o + A_{16} \text{ Cos } \Pi i + \sum_{k=1}^{15} \left(A_k \text{ Cos } \frac{2\Pi ki}{32} + B_k \text{ Sin } \frac{2\Pi ki}{32} \right)$$

$$Y_1 = A_o + A_{16} \cos \Pi i + \sum_{k=1}^{15} \left(\frac{1}{16} \sum_{i=o}^{31} Y_1 \cos \frac{2\Pi ki}{32} \cos \frac{2\Pi ki}{32} + \frac{1}{16} \sum_{i=o}^{31} Y_1 \sin \frac{2\Pi ki}{32} \sin \frac{2\Pi ki}{32} \right)$$

$$Y_1 = A_o + A_{16} \cos \Pi i + \frac{1}{16} \sum_{k=1}^{15} \sum_{i=o}^{31} \left(Y_1 \left(\cos \frac{2\Pi ki}{32} \right)^2 + Y_1 \left(\sin \frac{2\Pi ki}{32} \right)^2 \right)$$

$$Y_1 = A_o + A_{16} \cos \Pi i + \frac{1}{16} \sum_{i=o}^{31} \left(Y_1 \sum_{k=1}^{15} \left(\cos \frac{2\Pi ki}{32} \right)^2 + Y_1 \sum_{k=1}^{15} \left(\sin \frac{2\Pi ki}{32} \right)^2 \right)$$

Sedang

$$\sum_{k=1}^{15} \left(\cos \frac{2\Pi ki}{32} \right)^2 = \sum_{k=1}^{15} \frac{1}{2} \left(1 + \cos \frac{2\Pi ki}{16} \right)$$

$$= \left(\frac{15}{2} + \sum_{k=1}^{15} \cos \frac{2\Pi ki}{16} \right) = \frac{15}{2} + \frac{\sin \left(15 + \frac{1}{2}\right) \frac{2\Pi i}{16}}{2 \sin \frac{1}{2} \cdot \frac{2\Pi i}{16}} - \frac{1}{2}$$

$$= 7 + \frac{\sin \frac{31}{16} \Pi i}{2 \sin \frac{\Pi i}{16}}$$

$$\sum_{k=1}^{15} \left(\sin \frac{2\Pi ki}{32} \right)^2 = \sum_{k=1}^{15} \frac{1}{2} \left(1 - \cos \frac{2\Pi ki}{16} \right)$$

$$= \frac{15}{2} - \sum_{k=1}^{15} \cos \frac{2\Pi ki}{16} = \frac{15}{2} - \frac{\sin \frac{31}{16} \Pi i}{2 \sin \frac{\Pi i}{6}} + \frac{1}{2}$$

$$= 8 - \frac{\sin \frac{31}{16} \Pi i}{2 \sin \frac{\Pi i}{6}}$$

$$Y_i = A_o + A_{16} \cos \Pi i + \frac{1}{16} \sum_{i=o}^{31} \left(Y_1 \ (15) \right)$$

$$Y_i = A_o + A_{16} \cos \Pi i + 15 \left(\frac{1}{16} \sum_{i=o}^{31} Y_1 \right)$$

$$Y_i = A_o + A_{16} \cos \Pi i + 30 \ A_o = 31 \ A_o + A_{16} \cos \Pi i$$

Kedua ruas dikalikan Cos Πi

$$\text{-----> } Y_i \cos \Pi i = 31 \ A_o \cos \Pi i + A_{16} \ (\cos \Pi i)^2$$

Kemudian dijumlahkan menurut indeks i

$$\sum_{i=o}^{31} Y_1 \cos \Pi i = 31 \ A_o \sum_{i=o}^{31} \cos \Pi i + A_{16} \sum_{i=o}^{31} (\cos \Pi i)^2$$

Sedang diketahui

$$\sum_{i=o}^{31} \cos \Pi i = 0$$

$$\sum_{i=o}^{31} (\cos \Pi i)^2 = \frac{1}{2} \sum_{i=o}^{31} \left(1 + \cos 2\Pi i \right)$$

$$= \frac{1}{2} \left(32 + \sum_{i=o}^{31} \cos 2\Pi i \right) = \frac{1}{2} \ (32 + 32) = 32$$

$$\text{-----> } \sum_{i=o}^{31} Y_i \cos \Pi i = A_{16} \cdot 32$$

$$\boxed{A_{16} = \frac{1}{32} \sum_{i=o}^{31} Y_i \cos \Pi i}$$

Diketahui

$$Y = A_o + \sum_{k=1}^{16} \left(A_k \, Cos \, \frac{2\Pi ki}{32} + B_k \, Sin \, \frac{2\Pi ki}{32} \right)$$

$$Y_1 = A_o + \sum_{k=1}^{16} C_k \, Sin \left(\frac{2\Pi ki}{32} + \varnothing_k \right)$$

$$=====> \quad A_k \, Cos \, \frac{2\Pi ki}{32} + B_k \, Sin \, \frac{2\Pi ki}{32} = C_k \, Sin \left(\frac{2\Pi ki}{32} + \varnothing_k \right)$$

$$= C_k \, Sin \, \frac{2\Pi ki}{32} + Cos \, \varnothing_k + C_k \, Cos \, \frac{2\Pi ki}{32} \, . \, Sin \, \varnothing_k$$

Sehingga

$$A_k = C_k \, Sin \, \varnothing_k \; \& \; B_k = C_k \, Cos \, \varnothing_k$$

$$A_k^2 + B_k^2 = C_k^2 \, Sin^2 \, \varnothing_k + C_k^2 \, Cos^2 \, \varnothing_k$$

$$= C_k^2 \left(Cos^2 \, \varnothing_k + Sin^2 \, \varnothing_k \right) = C_k^2$$

$$------> \quad \boxed{C_k = \sqrt{A_k^2 + B_k^2}}$$

$$\frac{A_k}{B_K} = \frac{C_k \, Sin \, \varnothing_k}{C_k \, Cos \, \varnothing_k} = tg \, \varnothing_k \quad ------> \quad \boxed{\varnothing_k = tg^{-1} \left(\frac{A_k}{B_k} \right)}$$

Lampiran 2

Program Komputer dalam BASIC untuk penentuan Jenis Kelamin Tengkorak Manusia Dewasa dengan tracing bentuk Dahi dengan analisa Fourier.

```
10 CLS: N = 10
11 SCREEN 1
12 CLEAR
20 DIM X(4000),Y(4000),PSY(4000),S1(32),A(32),B(32),C(32)
26 :
27 REM pasang switch on off off
29 :
30 OPEN "COM1:9600,N,8,1" AS #1
40 PRINT #1,"T"
50 PRINT #1,"A"
60 INPUT #1,X,Y,F
70 IF F1 THEN 140
80 IF X5000 AND Y5000 THEN 130
90 PSET(X/10,250-Y/10),2
100 N = N + 1: X(N) = X/10: Y(N) = Y/10
110 GOTO 40
120 :
130 CLS
140 X1 = X(1): Y1 = Y(1): XN = X(N): YN = Y(N)
150 XD = XN-X1: YD = YN-Y1
160 L = ATN(YD/XD):SINL = SIN(L): COSL = COS(L):TANL = TAN(L)
170 FOR I = 1 TO N
180 XZ = X(I)-X1:YZ = Y(I)-Y1
190 X(I) = XZ*COSL + YZ*SINL:Y(I) = YZ*COSL-XZ*SINL
200 PSET(X(I),200-Y(I)),2
210 NEXT I
220 '
230 FOR I = 1 TO N-1
240 A = (Y(I + 1)-Y(I))/(X(I + 1)-X(I))
250 X1 = FIX(X(I)): X2 = FIX(X(I + 1))
260 FOR J = X1 TO X2
270 YJ = Y(I) + A*(J-X(I))
280 PSY(J) = YJ:PSET(J,200-YJ),2
290 NEXT J
300 NEXT I
310 '
320 W = J/32
330 FOR I = 0 TO 31
340 A = W*I: B = FIX(A): C = A-B
350 Z = PSY(B + 1)-PSY(B)
360 S1(I) = PSY(B) + Z*C
370 CIRCLE(A,200-S1(I)),2,1
380 NEXT I
390 PRINT
393 PRINT "MEREKAM DATA Y"
```

```
395 PRINT
398 INPUT "CACAH DATA =";R
400 REM DIM U(R)
403 PRINT
405 FOR I = 1 TO R
408 PRINT "DATA";I;
410 PRINT" =";S1(I)
413 NEXT I
415 INPUT "DATA DIREKAM DALAM DRIVE (A/B) ?";U$
418 IF U$ = "A" OR U$ = "a" THEN DR$ = "A:"
420 IF U$ = "B" OR U$ = "b" THEN DR$ = "B:"
423 PRINT
425 INPUT "NAMA BERKAS REKAMAN DATA =";M$
428 Q$ = DR$ + M$
430 OPEN "O",#2,Q$
431 PRINT
433 PRINT "SEDANG MEREKAM !"
435 FOR I = 1 TO R
437 WRITE #2, S1(I)
438 NEXT I
439 CLOSE
440 FOR I = 0 TO 31
443 PRINT
445 A(0) = A(0) + S1(I)
450 NEXT I
455 A(0) = A(0)/32
460 FOR K = 1 TO 15
465 AK = 0: BK = 0
470 FOR I = 0 TO 31
475 Z = 2*3.1416*K*I/32
480 AK = AK + S1(I)*COS(Z): BK = BK + S1(I)*SIN(Z)
490 NEXT I
500 A(K) = AK/16: B(K) = BK/16
505 C(K) = SQR(A(K)*A(K) + B(K)*B(K))/A(0)*100
510 LOCATE 0 + K,30,1
520 PRINT "D";: PRINT USING "##";K;: PRINT " = ";
525 PRINT USING "###.##";C(K)
530 NEXT K
540 FOR I = 0 TO 31
550 C(16) = C(16) + S1(I)*COS(3.1416*I)
560 NEXT I
570 C(16) = C(16)/32/A(0)*100
580 LOCATE 16,30,1
590 PRINT "D";: PRINT USING "##";K;: PRINT " = ";
595 PRINT USING "###.##";C(16)
600 SCORE = -.126792*C(2) + .300085*C(4) + .878704*C(5) + 2.102436*C(7) + 1.160594*C(13)-
8.959102
610 LOCATE 12,1,1
620 COLOR 8,1
630 PRINT "D.F SCORE = ";
```

```
640 PRINT USING "##.##";SCORE
650 LOCATE 14,1,1: PRINT "KESIMPULAN =  ";
660 IF SCORE = 0 THEN PRINT "NOT DEFINE"
670 IF SCORE0 THEN PRINT "LAKI LAKI"
680 IF SCORE THEN PRINT "PEREMPUAN"
690 PRINT
695 PRINT "MEREKAM DATA"
700 PRINT
710 INPUT "CACAH DATA = ";K
720 DIM T(K)
730 PRINT
740 FOR I = 1 TO K
750 PRINT "DATA";I;
760 PRINT"  = ";C(I)
770 NEXT I
780 PRINT
785 INPUT "DATA DIREKAM DALAM DRIVE (A/B) ?";T$
790 'T$ = INPUT$(1)
800 IF T$ = "A" OR T$ = "a" THEN DR$ = "A:"
810 IF T$ = "B" OR T$ = "b" THEN DR$ = "B:"
820 PRINT
830 INPUT "NAMA BERKAS REKAMAN DATA  = ";N$
840 Z$ = DR$ + N$
845 OPEN "O",#3,Z$
850 PRINT
860 PRINT
870 PRINT "SEDANG MEREKAM DATA"
900 FOR I = 1 TO K
910 WRITE #3, C(I)
920 NEXT I
930 CLOSE
940 PRINT "BILA AKAN TRACING LAGI - F2"
950 PRINT
960 END
```

Lampiran 3

HASIL ANALISIS FUNGSI DISKRIMINAN

SPSS/PC+ The Statistical Package for IBM PC
TRANSLATE FROM 'A:BLKEP.DBF'.
100 cases written to the uncompressed active file.
DSCRIMINANT /GROUPS SEX (1,2) /VARIABLES N1 TO N16 /METHOD MAHAL /STATISTICS 6 10 11 12 13 15.
On groups defined by SEX
Wilks' Lambda (U-statistic) and univariate F-ratio
with 1 and 98 degrees of freedom

Variable	Wilks' Lambda	F	Significance
N1	.97342	2.676	.1051
N2	.97632	2.377	.1263
N3	.99244	.7466	.3897
N4	.99569	.4246	.5162
N5	.92258	8.224	.0051
N6	.90090	10.78	.0014
N7	.94897	5.269	.0238
N8	.92748	7.662	.0067
N9	.93003	7.372	.0078
N10	.93946	6.315	.0136
N11	.92747	7.664	.0067
N12	.93504	6.808	.0105
N13	.95254	4.883	.0295
N14	.95211	4.929	.0287
N15	.94707	5.477	.0213
N16	.95249	4.888	.0294

Summary Table

Unstandardized Canonical Discriminant Function Coefficients

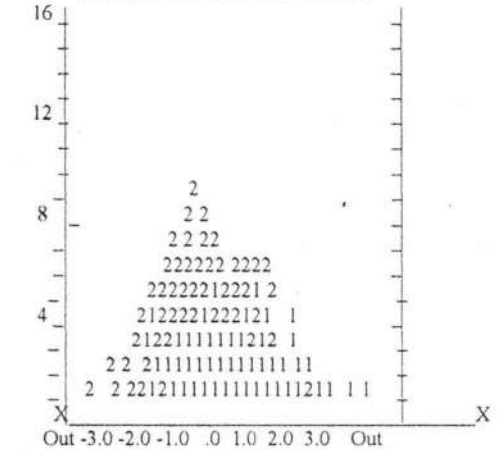
	FUNC 1
N1	.1876825
N3	-.4844204
N5	1.642384
N6	1.364834
N7	-.424971
N11	1.368448
N16	-1.973971
(constant)	-15.68880

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	.49081
2	-.49081

Symbol	Group	Label
1	1	
2	2	

Canonical Discriminant Function 1



Classification Results - Actual Group	No. of Cases	Predicted Group Membership 1	2
Group 1	50	33 66.0%	17 34.0%
Group 2	50	15 30.0%	35 70.0%

Percent of "grouped" cases correctly classified: 68.00%

SPSS/PC+ The Statistical Package for IBM PC
TRANSLATE FROM 'a.dahl.dat'.

95 cases written to the uncompressed active file.
DSCRIMINANT /GROUPS SEX (1,2) /VARIABLES N1 TO N16 /METHOD MAHAL /STATISTICS 6 10 11 12 13 15.
-------- DISCRIMINANT ANALYSIS ------On groups defined by SEX
Wilks' Lambda (U statistic) and univariate F ratio
with 1 and 93 degrees of freedom

Variable	Wilks' Lambda	F	Significance
N1	.70459	38.99	.0000
N2	.91395	8.757	.0039
N3	.61062	57.09	.0000
N4	.38701	147.3	.0000
N5	.70515	38.89	.0000
N6	.90325	9.962	.0022
N7	.90442	9.829	.0023
N8	.94185	5.742	.0186
N9	.94268	5.655	.0194
N10	.92085	7.994	.0057
N11	.96893	2.982	.0875
N12	.99096	.8483	.3594
N13	.97789	2.103	.1504
N14	.98388	1.524	.2202
N15	.99402	.5598	.4562
N16	.98015	1.863	.1755

On groups defined by SEX

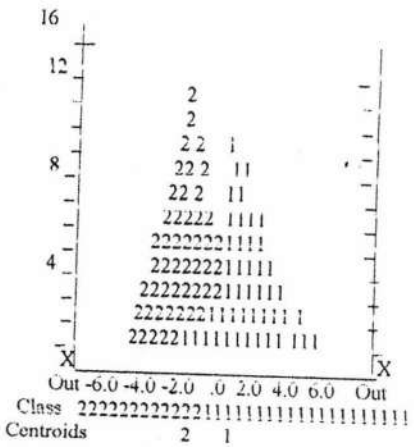
Unstandardized Canonical Discriminant Function Coefficients

	FUNC 1
N2	-.2352385
N3	.2362997
N4	1.009066
(constant)	-4.647754

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	1.38742
2	-1.30248

Symbol	Group Label
1	1
2	2



Classification Results - Actual Group		No. of Cases	Predicted Group Membership 1	2
Group	1	46	41 89.1%	5 10.9%
Group	2	49	3 6.1%	46 93.9%

Percent of "grouped" cases correctly classified: 91.58%

TRANSLATE FROM 'a:cranium.dbf'.

DSCRIMINANT /GROUPS SEX (1,2) /VARIABLES N1 TO N80 /METHOD MAHAL /STATISTICS 6 10 11 12 13 15.

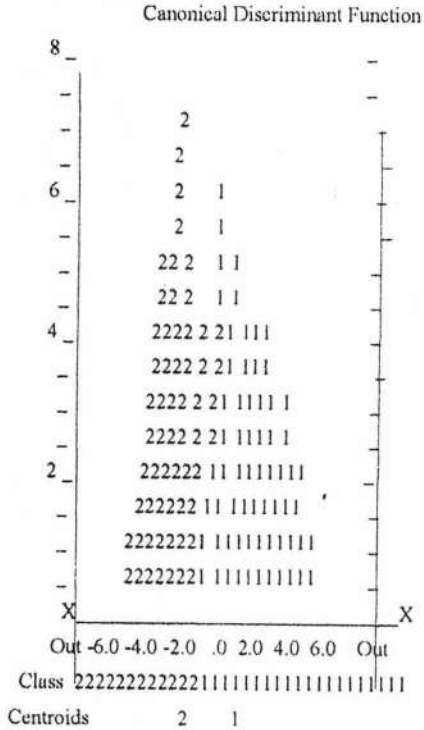
Summary Table

Unstandardized Canonical Discriminant Function Coefficients

	FUNC 1
N4	83.50577
N10	201.9939
N11	76.92112
N13	118.3721
N14	-181.9347
N17	-430.2861
N18	-203.2189
N19	99.01365
N20	276.3003
N34	699.6922
N39	-446.1911
N47	-657.1247
N49	-382.5926
N50	-1006.333
N55	-485.9524
N62	-1485.651
N68	478.5368
N76	769.9394
(constant)	54.75253

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	1.64428
2	-1.80871



Classification Results - Actual Group		No. of Cases	Predicted Group Membership 1	2
Group	1	33	31	2
			93.9%	6.1%
Group	2	30	2	28
			6.7%	93.3%

Percent of "grouped" cases correctly classified: 93.65%

```
TRANSLATE FROM 'a:mandibl.dbf'.

57 cases written to the uncompressed active file.
```

Summary Table

Step	Action Entered	Action Removed	Vars In	Wilks' Lambda	Sig.	Minimum D Squared	Sig.	Between Groups	
1	N68		1	.90881	.0224	.39717	.0224	1	2
2	N8		2	.80718	.0031	.94555	.0031	1	2
3	N57		3	.73640	.0010	1.41688	.0010	1	2
4	N77		4	.69582	.0007	1.73039	.0007	1	2
5	N3		5	.65987	.0006	2.04030	.0006	1	2
6	N58		6	.62580	.0005	2.36692	.0005	1	2
7	N54		7	.58839	.0003	2.76911	.0003	1	2
8	N26		8	.54440	.0001	3.31266	.0001	1	2
9	N49		9	.49911	.0001	3.97250	.0001	1	2
10	N14		10	.45745	.0000	4.69469	.0000	1	2
11		N8	9	.46707	.0000	4.51657	.0000	1	2
12	N74		10	.42604	.0000	5.33267	.0000	1	2
13	N79		11	.40047	.0000	5.92588	.0000	1	2
14	N37		12	.38511	.0000	6.32005	.0000	1	2
15	N50		13	.36004	.0000	7.03574	.0000	1	2
16	N30		14	.33611	.0000	7.81864	.0000	1	2
17	N51		15	.32294	.0000	8.29872	.0000	1	2
18		N79	14	.32941	.0000	8.05828	.0000	1	2
19	N21		15	.31302	.0000	8.68732	.0000	1	2
20	N46		16	.29186	.0000	9.60431	.0000	1	2
21		N30	15	.29547	.0000	9.43847	.0000	1	2
22	N33		16	.26126	.0000	11.19285	.0000	1	2
23		N54	15	.26359	.0000	11.05877	.0000	1	2
24		N49	14	.26622	.0000	10.91043	.0000	1	2
25	N31		15	.25071	.0000	11.83028	.0000	1	2
26	N6		16	.23791	.0000	12.67970	.0000	1	2
27	N28		17	.22742	.0000	13.44723	.0000	1	2
28	N11		18	.21113	.0000	14.78975	.0000	1	2
29		N26	17	.21403	.0000	14.53565	.0000	1	2
30	N53		18	.19621	.0000	16.21562	.0000	1	2
31	N5		19	.18547	.0000	17.38332	.0000	1	2
32	N13		20	.17475	.0000	18.69278	.0000	1	2
33		N14	19	.17594	.0000	18.54005	.0000	1	2
34	N80		20	.16680	.0000	19.77278	.0000	1	2
35	N15		21	.15516	.0000	21.55354	.0000	1	2
36		N33	20	.15630	.0000	21.36682	.0000	1	2
37		N74	19	.15824	.0000	21.05691	.0000	1	2
38	N44		20	.14826	.0000	22.74060	.0000	1	2
39		N3	19	.15134	.0000	22.19716	.0000	1	2
40	N59		20	.13884	.0000	24.55270	.0000	1	2
41	N49		21	.12845	.0000	26.85763	.0000	1	2
42	N65		22	.11993	.0000	29.04776	.0000	1	2
43	N52		23	.11438	.0000	30.64732	.0000	1	2
44		N57	22	.11695	.0000	29.88934	.0000	1	2
45	N30		23	.10991	.0000	32.05664	.0000	1	2
46	N76		24	.10178	.0000	34.93122	.0000	1	2
47		N15	23	.10481	.0000	33.80672	.0000	1	2
48	N34		24	.09815	.0000	36.37280	.0000	1	2
49	N69		25	.09434	.0000	37.99762	.0000	1	2
50	N40		26	.09090	.0000	39.58671	.0000	1	2
51	N79		27	.08746	.0000	41.29840	.0000	1	2
52		N65	26	.08846	.0000	40.78968	.0000	1	2
53	N38		27	.08146	.0000	44.63587	.0000	1	2
54	N39		28	.07676	.0000	47.60609	.0000	1	2
55	N60		29	.07270	.0000	50.49203	.0000	1	2
56	N70		30	.06887	.0000	53.51876	.0000	1	2

Classification Function Coefficients
(Fisher's Linear Discriminant Functions)

N128 =	1	2
N5	-3439.625	-2443.706
N6	2816.834	1835.543
N11	5387.591	3825.769
N13	8181.663	5149.049
N21	-6266.195	-3977.273
N28	5070.638	2672.089
N30	-12646.43	-9649.712
N31	-6378.045	-4332.333
N34	7556.040	5452.627
N37	4777.871	3303.133
N38	-9528.183	-5903.715
N39	1769.341	354.7395

N40	400.0366	-639.3354
N44	-13530.36	-8025.321
N46	-8161.239	-5782.685
N49	35.82261	2064.002
N50	-21294.81	-13690.55
N51	-5723.217	-2572.406
N52	-15060.65	-9949.536

Classification Function Coefficients
(Fisher's Linear Discriminant Functions)

N128 =	1	2
N53	6601.388	2207.802
N58	6551.590	3537.782
N59	10924.69	7183.079
N60	1423.340	-595.6592
N68	22752.49	14847.32
N69	-16441.02	-5669.066
N70	7688.149	4758.240
N76	15233.24	9930.179
N77	-12424.03	-5559.102
N79	8327.156	3802.306
N80	-10041.33	-3138.831
(constant)	-254.0515	-150.7537

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0689	107.023	30	.0000
1*	13.5205	100.00	100.00	.9650	:				

* marks the 1 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1
N5	-4.77458
N6	17.23716
N11	9.03532
N13	10.06621
N21	-6.05310
N28	5.21953
N30	-3.36007
N31	-3.00629
N34	2.85073
N37	1.03899
N38	-2.98651
N39	1.05221
N40	.70378
N44	-4.15853
N46	-1.18080
N49	-.71888
N50	-2.77902
N51	-1.80466
N52	-2.36003
N53	1.32018
N58	.94046
N59	.97831
N60	.74085
N68	1.41270
N69	-1.80640
N70	.51375
N76	.76272
N77	-.90916
N79	.92852
N80	-1.15021

Structure Matrix:
Pooled-within-groups correlations between discriminating variables
and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1
N14	-.09738
N1	-.08754
N2	.08754
N3	.08754
N68	.08615
N10	.08266
N76	.07694

N71	.07426
N35	.07019
N57	-.06919
N24	-.06507
N7	.06472
N61	-.06221
N65	-.06095
N79	-.06072
N63	.05771
N40	.05749
N52	-.05748
N29	-.05587
N8	.05150
N45	.04987
N6	.04957
N12	.04891
N9	.04871
N56	-.04793
N48	.04572
N47	-.04557
N22	-.04504
N20	-.04466
N17	.04371
N5	.04358
N44	-.04233
N43	-.04098
N42	.03670
N11	-.03622
N72	-.03575
N74	.03463
N60	-.03298
N46	-.03288
N19	.03265
N34	.03079
N51	-.03067
N25	.03056
N55	.02930
N18	-.02853
N21	-.02784
N31	.02712
N69	-.02650
N77	-.02444
N4	-.02434
N39	-.02342
N64	-.02297
N80	-.02243
N75	-.02214
N59	-.02121
N26	.02064
N67	-.01947
N62	-.01786
N73	-.01548
N37	.01525
N78	.01350
N54	-.01192
N13	-.00943
N16	.00880
N50	.00811
N66	-.00808
N32	-.00699
N58	.00686
N27	-.00614
N41	.00587
N53	.00565
N36	-.00502
N33	-.00458
N15	.00313
N70	-.00301
N49	-.00281
N30	-.00272
N38	.00167
N28	-.00137
N23	-.00007

Unstandardized Canonical Discriminant Function Coefficients

	FUNC 1
N5	-136.1353
N6	134.1359
N11	213.4904
N13	414.5378

N21	-312.8801
N28	327.8654
N30	-409.6308
N31	-279.6350
N34	287.5222
N37	201.5867
N38	-495.4402
N39	193.3664
N40	142.0751
N44	-752.5015
N46	-325.1322
N49	-277.2383
N50	-1039.452
N51	-430.6946
N52	-698.6547
N53	600.5735
N58	411.9672
N59	511.4527
N60	275.9835
N68	1080.584
N69	-1472.453
N70	400.4987
N76	724.8920
N77	-938.3890
N79	618.5164
N80	-943.5243
(constant)	-14.69766

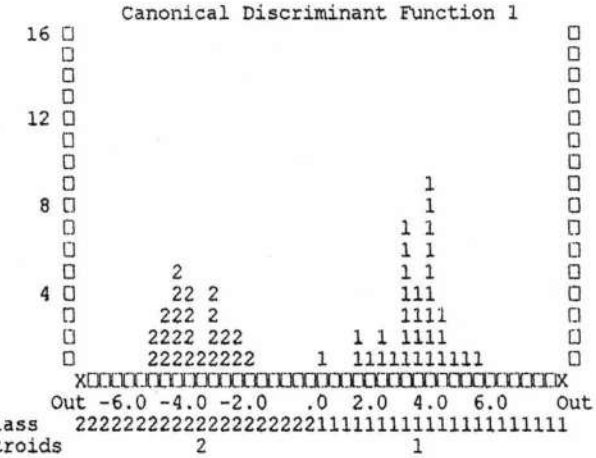
Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1
1	3.08027
2	-4.23538

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	

All-groups stacked Histogram



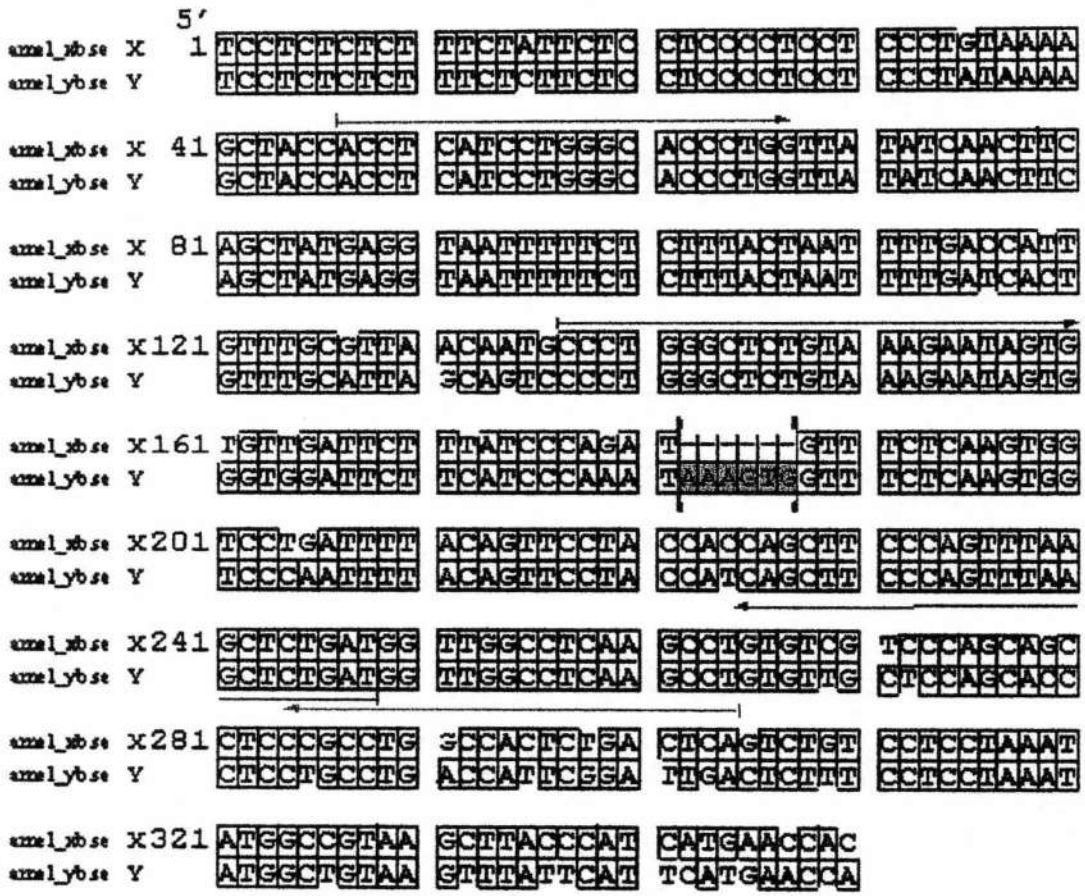
Classification Results -

Actual Group		No. of Cases	Predicted Group Membership 1	2
Group	1	33	33	0
			100.0%	.0%
Group	2	24	0	24
			.0%	100.0%

Percent of "grouped" cases correctly classified: 100.00%

COMMERCIAL PRIMERS

Amelogenin Sequence from Genbank
(Comparison of X and Y Chromosomes)



* Promega Primers (X= 212 bp, Y = 218 bp)
● British Primers (X= 106 bp, Y = 112 bp)

Ref. (97) Sullivan, K.M., *et al.* (1993) *BioTechniques* 15(40: 636-641

GenBank Database Document Reader

Lampiran 5

Amelogenin Sequence dari Genbank (Perbandingan X dan Y Chromosome)

```
LOCUS       HUMAMELX     2872 bp    DNA
DEFINITION  Human amelogenin (AMELX) gene
ORIGIN      Chromosome X.
      361 cctaccacca gcttcccagt ttaagctctg atggttggcc tcaagcctgt gtcgtcccag
      421 cagcctcccg cctggccact ctgactcagt ctgtcctcct aaatatggcc gtaagcttac
      481 ccatcatgaa ccactactca gggaggctcc atgatagggc aaaaagtaaa ctctgaccag
      541 cttggttcta acccagctag taaaatgtaa ggattaggta agatgttatt taaaactctt
      601 tccagctcaa aaaactcctg attctaagat agtcacactc tatgtgtgtc tcttgcttgc
      661 ctctgctgaa atattagtga ctaagtggta taggagagac tccgcagaac agcggaatgc
      721 atgagttttg gacgtcgggt ttgaggttct cctcaacctc ttactaactt tgtgattttg
      781 ggcaaatcat ttcctctttc tggaaccctg gtttcctcat ctggagaaag gaaataatta
      841 taataaccat atttcaaaat attgtttgga gagtaatata gttaatgaat atgaaaagtg
      901 ctttgtcaag tataatatga gcaaggttac tgattatttt ttgtatcgat taaatgccgt
      961 attactatat gaagaatcct caaacctaag gctaaccaag tatatatact gttcagaaag
     1021 gaataagatt cttacttctc tcacaggttc aggtaacaat ctatgagttt atttacttat
     1081 aaaagctgaa gacaaatgtt agtaagattt tgaggcaaga ttttctgttg aaccgaaaag
     1141 attgacacat ctgatcagtc aatctgtgtt tctaggatga gggacagtgt ttgcacctct
     1201 ctttttccca ttgtgacatc aaagaaaaaa atgaaattaa catcatgtca tattattatg
     1261 tcataatttt gtgtttgttt tgctcttaca atgaaaagaa ggaactatgg aattaaacag
     1321 atttactccc tgtgtaacct cagtcaagtt aatgaatctc tttaactccc cataacctta

LOCUS       HUMAMELY     3272 bp    DNA
DEFINITION  Human amelogenin (AMELY) gene
ORIGIN      Chromosome Y.

      361 acagttccta ccatcagctt cccagtttaa gctctgatgg ttggcctcaa gcctgtgttg
      421 ctccagcacc ctcctgcctg accattcgga ttgactcttt cctcctaaat atggctgtaa
      481 gtttattcat tcatgaacca ctgctcagga aggttccatg aaagggcaaa aagtcaactc
      541 tgactgacca gcttggttct atcccatccg gtaaaatgta aagattaggt aaaattacta
      601 actttgggca aataatttcc tctctttgga accctggttt tctcatttgg acaagggaaa
      661 ttactgtaat attcacattt caaaatattg gagaataata tagttaacaa ttataaaaac
      721 tgctttgtca agtataatat gagcaaggta actgattttt tattgattac atcgtgtatt
      781 accatataaa gaatccccaa acctaaggtt aactaagtgt gtatactgtt cagaaaggaa
      841 taaaattctt acttctctca taggttcagg taacaatctg tgagtttatt tacttacaca
      901 agctgctgac aaatgttaat aagaatctga ggcaaggttt tctgttaaac ctaaaagatt
      961 gacaaatttg atcagtaaaa tctgtgtttt taggttgagg gacagtgttt gcaccgcttt
     1021 tttccccatt gtgacatcaa aggaaagatg aaattaacat tatgtcacat tattgcggca
     1081 taattttatg tttgctttgc tcttacaatg aaaagcagga cctatggaaa taaacagatt
     1141 tactcccttt gtaacttcag tcaagttaat gaatctcttt aacttcccat gaccttatct
     1201 aaaaagtgag agtaacaata cttgcctcct agcatataag gaaagatgaa gaatgtgtgt
```

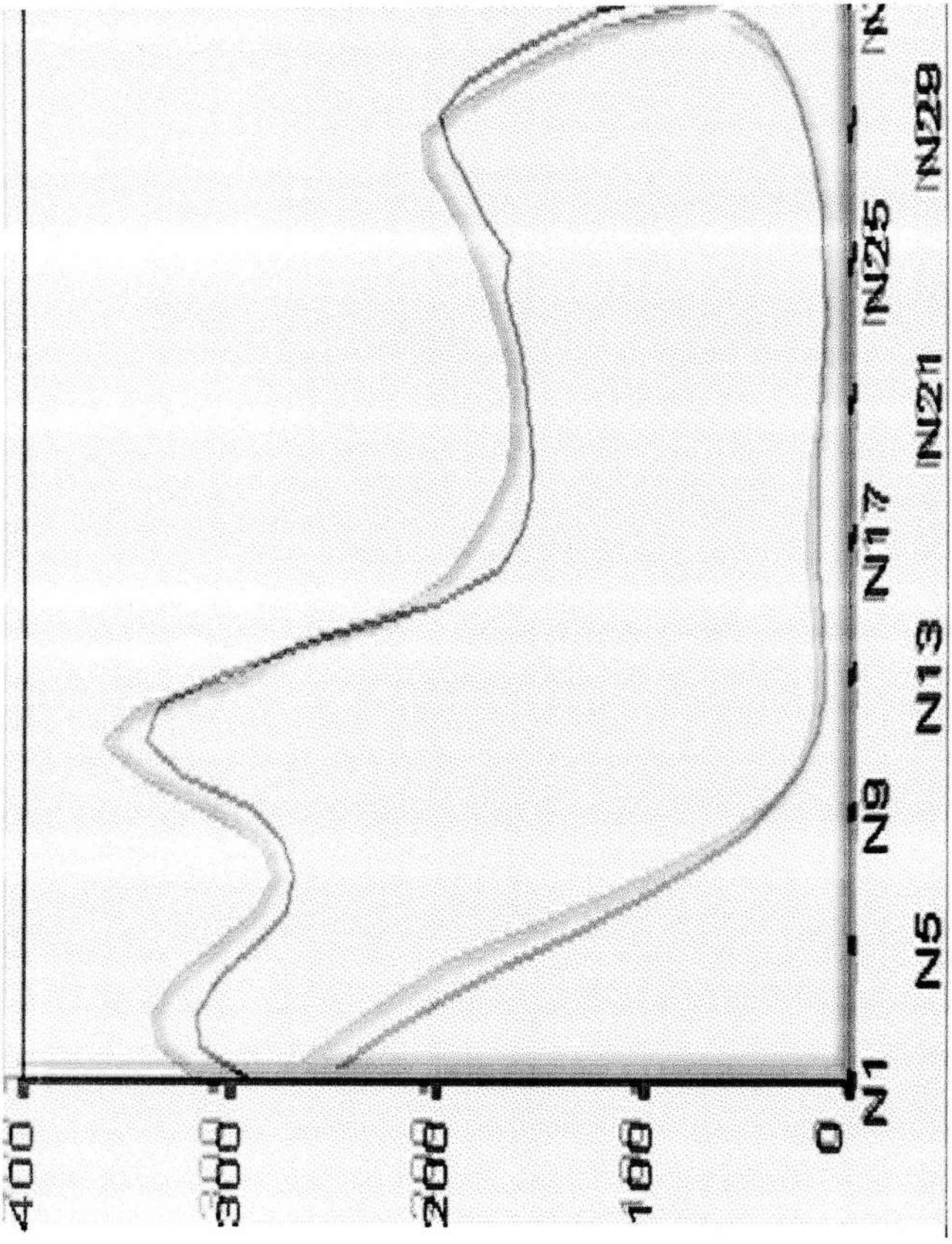
Primer yang digunakan dalam riset ini:

INDRASEX1 5'-CTGATGGTTGGCCTCAAGCCTGTG-3'

INDRASEX2 5'-TAAAGAGATTCATTAACTTGACTG-3'

Amplifikasi menghasilkan X = 977 bp ; Y = 788 bp

Lampiran 6



Lampiran 7

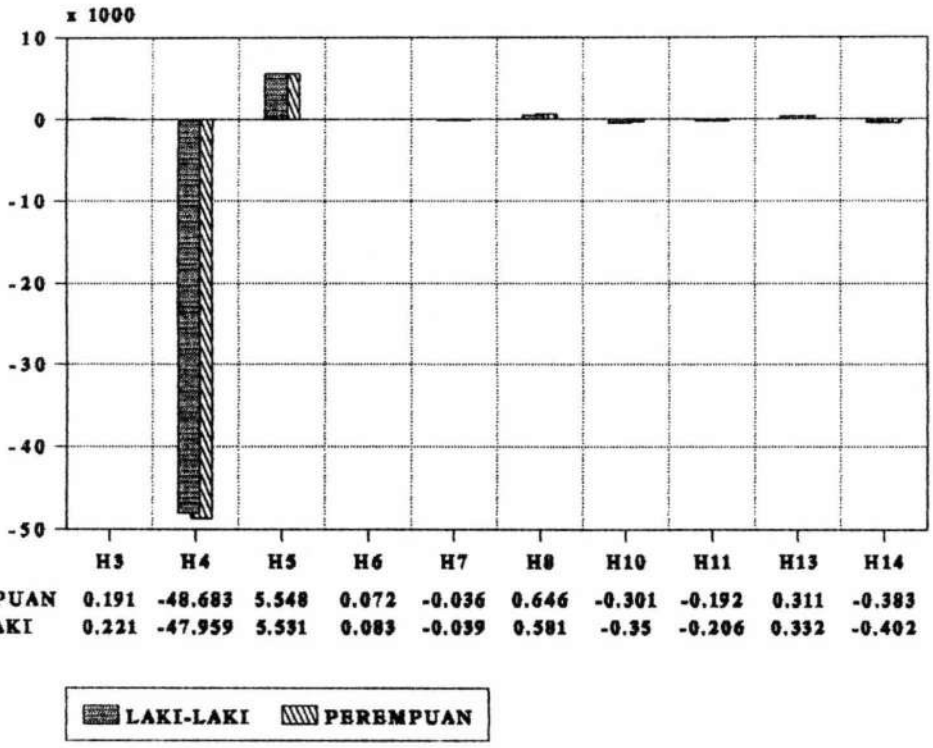
	var00001	var00002	var00003
1	1.00	131.00	1.00
2	2.00	140.00	1.00
3	3.00	134.00	1.00
4	4.00	125.00	1.00
5	5.00	120.00	1.00
6	6.00	130.00	1.00
7	7.00	135.00	1.00
8	8.00	133.00	1.00
9	1.00	73.00	2.00
10	2.00	75.00	2.00
11	3.00	71.00	2.00
12	4.00	74.00	2.00
13	5.00	71.00	2.00
14	6.00	70.00	2.00
15	7.00	72.00	2.00
16	8.00	77.00	2.00
17	1.00	81.00	3.00
18	2.00	84.00	3.00
19	3.00	88.00	3.00
20	4.00	80.00	3.00
21	5.00	82.00	3.00
22	6.00	81.00	3.00
23	7.00	78.00	3.00
24	8.00	85.00	3.00
25	1.00	53.00	4.00
26	2.00	53.00	4.00
27	3.00	51.00	4.00
28	4.00	50.00	4.00
29	5.00	51.00	4.00

	var00001	var00002	var00003
30	6.00	50.00	4.00
31	7.00	49.00	4.00
32	8.00	49.00	4.00
33	1.00	31.00	5.00
34	2.00	35.00	5.00
35	3.00	32.00	5.00
36	4.00	33.00	5.00
37	5.00	30.00	5.00
38	6.00	32.00	5.00
39	7.00	30.00	5.00
40	8.00	30.00	5.00
41	1.00	12.00	6.00
42	2.00	12.00	6.00
43	3.00	10.00	6.00
44	4.00	12.00	6.00
45	5.00	12.00	6.00
46	6.00	10.00	6.00
47	7.00	11.00	6.00
48	8.00	11.00	6.00
49	1.00	17.00	7.00
50	2.00	20.00	7.00
51	3.00	21.00	7.00
52	4.00	16.00	7.00
53	5.00	18.00	7.00
54	6.00	20.00	7.00
55	7.00	19.00	7.00
56	8.00	20.00	7.00
57	1.00	6.00	8.00
58	2.00	4.00	8.00

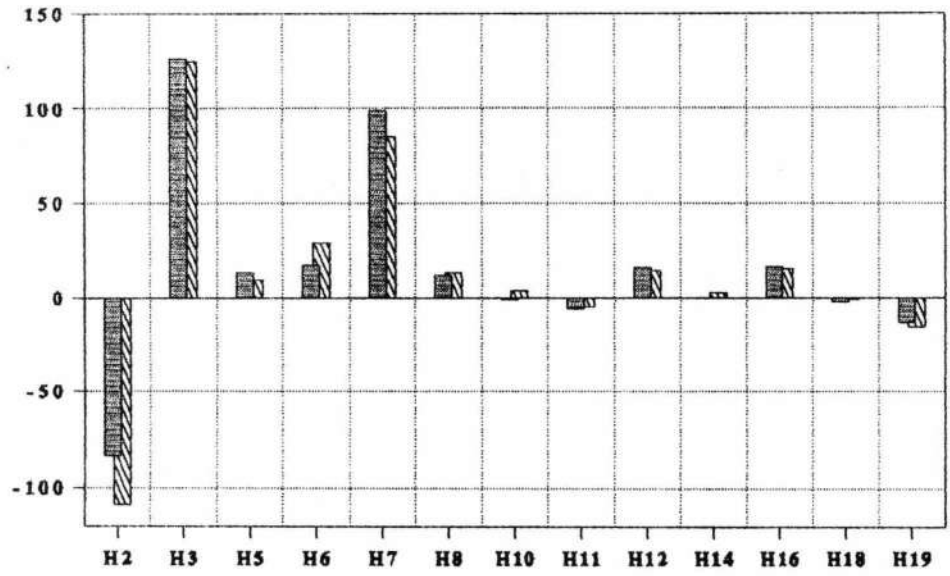
Untitled

	var00001	var00002	var00003
59	3.00	4.00	8.00
60	4.00	3.00	8.00
61	5.00	4.00	8.00
62	6.00	5.00	8.00
63	7.00	4.00	8.00
64	8.00	4.00	8.00

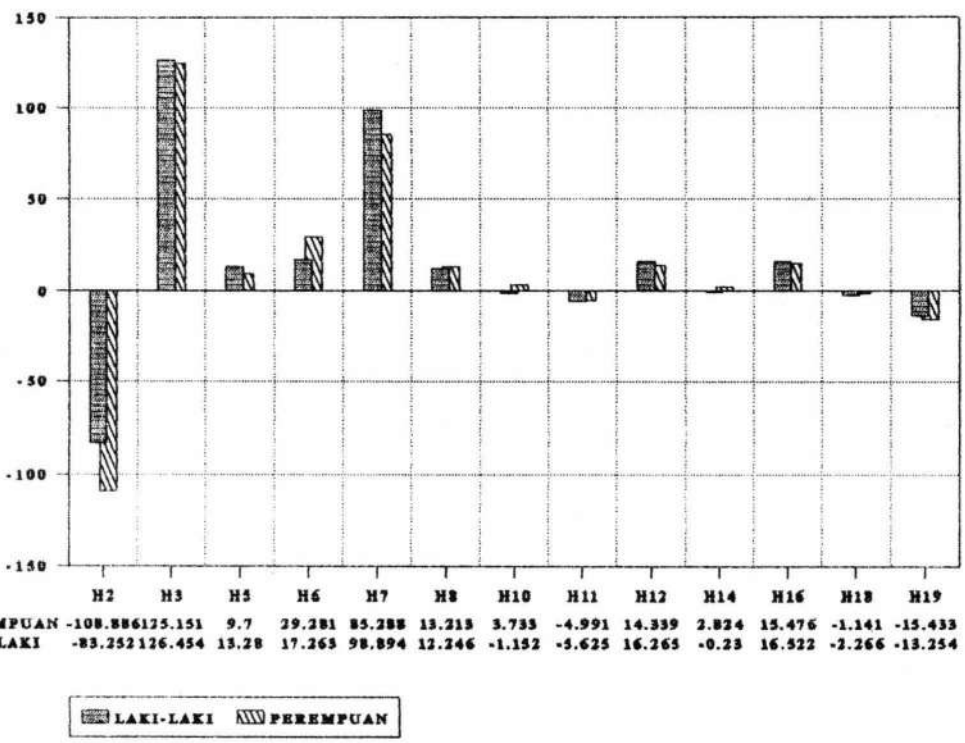
GRAFIK POLA
(CRANIUM)



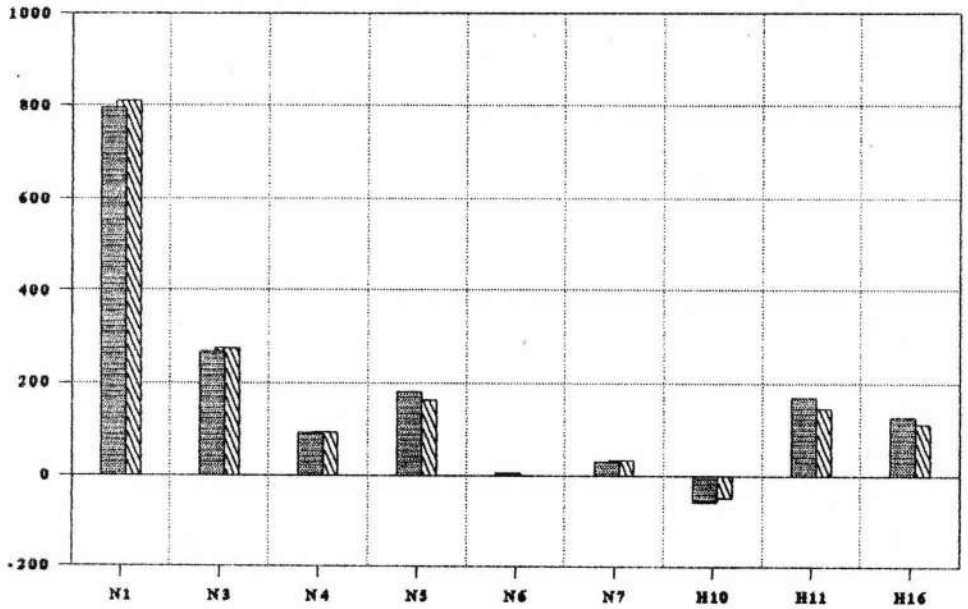
GRAFIK POLA
(MQNDIBL)



GRAFIK POLA
(MQNDIBL)



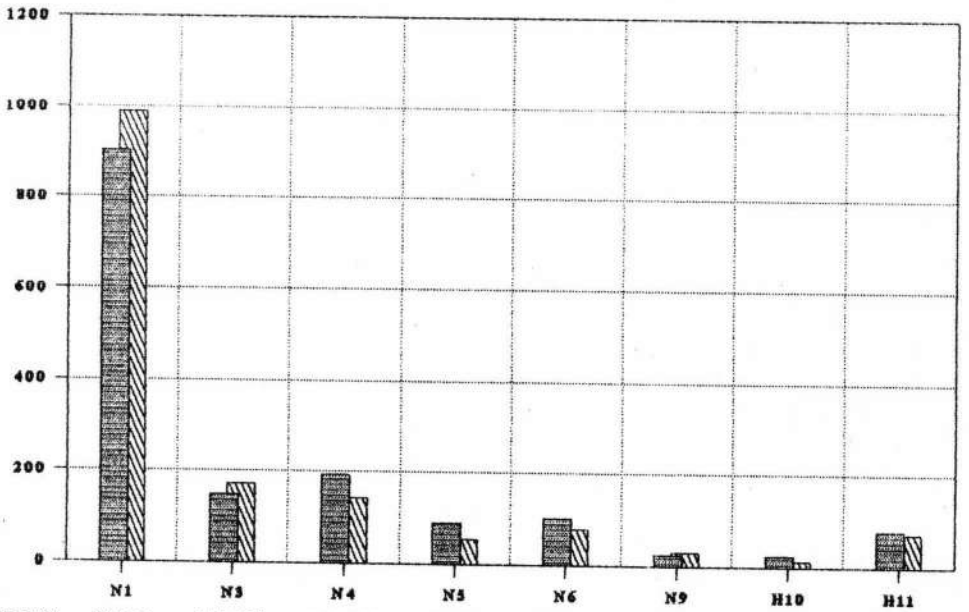
GRAFIK POLA
(BLKBP)



	N1	N3	N4	N5	N6	N7	H10	H11	H16
PEREMPUAN	811.315	273.938	93.139	160.478	-0.848	31.846	-48.463	165.8	110
LAKI-LAKI	795.791	266.782	91.065	180.972	4.655	30.352	-56.658	168.832	126.153

LAKI-LAKI PEREMPUAN

GRAFIK POLA
(DAHI)



	N1	N3	N4	N5	N6	N9	H10	H11
PEREMPUAN	991.19	170.208	141.608	55.635	76.675	29.683	13.174	72.653
LAKI-LAKI	903.898	147.299	190.651	88.308	102.465	25.589	25.714	75.913

LAKI-LAKI PEREMPUAN