GENERAZIONE DI DISPOSIZIONI, LORO SCELTA E CORRELAZIONE DI SUONI

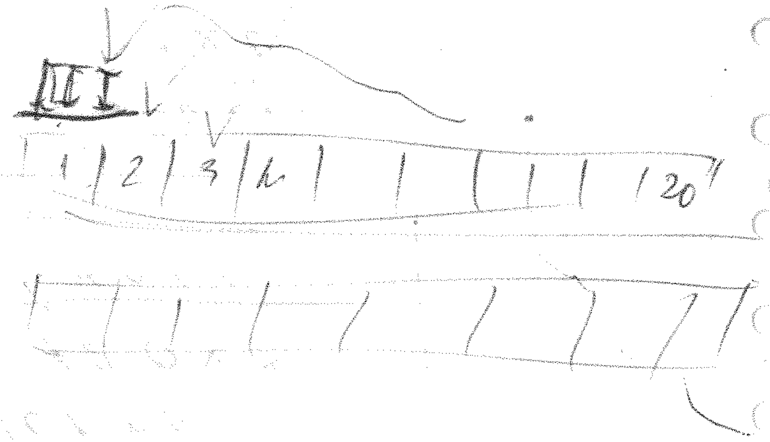
FORTRAN IV   MODEL 44 PS   VERSION 3, LEVEL 3   DATE 70240   PAGE 0001

```
      SUBROUTINE CALMUS                                              2140
      COMMON FR,T      ,R,S,INIZ,IFIN,IPAS,IDENT(2),BATS,RDCND,MA,KS,
     *ALR,DURA,NOA,IP,KONT
      DIMENSION NNN(1700),I(10),NN(10),FFR(20),TT(20),III(20),
     1FR(5000),T(5000),NP(10)
      REAL KFT(8)
      READ(5,10)N1,N2
   10 FORMAT(2I4)
      N=4
      LN=1
      KK=0
      KONT=0
      KKONT=0
      L=0
      LL=0
      KP=0
    8 K=0
   11 K=K+1
      IF(K.LE.N)GO TO 12
      LN=LN+1
      IF(LN.GT.5)GO TO 50
      GO TO 8
   12 DO 15 M=1,K
   15 I(M)=1
   20 KK=KK+1
      NNN(KK)=0
      DO 30 J=1,K
      NN(J)=I(J)*(10**(J-1))
   30 NNN(KK)=NNN(KK)+NN(J)
      LL=LL+1
   37 III(LL)=NNN(KK)
      IF(LL.LT.20)GO TO 33
      WRITE(6,1)(III(LL),LL=1,20)
    1 FORMAT(1X,20I6)
      LL=0
   33 DO 35 M=1,K
      DO 35 M=1,K
      I(M)=I(M)+1
      IF(I(M).LE.N)GO TO 20
   35 I(M)=1
      GO TO 11
   50 N2=N2*23
      N1=(N1*23)+(N2/10000)
      N2=IABS(MOD(N2,10000)-(N1/10000))
      IF(N2.LE.0)N2=1000
      N1=MOD(N1,10000)
      IF(N1.LE.0)N1=1000
      NP(2)=N1/100
      NP(4)=MOD(N1,100)
```

costruzione delle disposizioni con ripetizione a K a K; N=4

vengono perforate le cifre da 1 ÷ 4444

ricerca numero casuale di 8 cifre e scomposizione in 4 numeri di 2 cifre



```
      NP(6)=N2/100
      NP(8)=MOD(N2,100)
      DO 40 II=2,8,2
      IF(NP(II).EQ.0)NP(II)=1
   40 CONTINUE
      IF(L.NE.0)GO TO 60
      KP=KP+1
      FFR(KP)=FLOAT(NP(2))*FLOAT(NP(4))/2.
      TT(KP)=FLOAT(NP(4))/FLOAT(NP(6))/10.*0.2
      WRITE(6,2)KP,FFR(KP),TT(KP)
    2 FORMAT(1X,I4,2F10.3)
      IF(KP.LT.20)GO TO 50
      L=1
      IF(N2.GT.99)N2=99
      JI=N2
      GO TO 50
   60 IF(NP(8).EQ.99)KJ=N1/1000
      IF(NP(8).GE.97.AND.NP(8).LE.98)KJ=N1/100
      IF(NP(8).GE.77.AND.NP(8).LE.96)KJ=N1/10
      IF(NP(8).LE.76)KJ=N1
      IF(KJ.GT.1700)GO TO 50
      IF(KJ.LE.0)GO TO 50
   80 J=5
      DO 110 JJ=1,7,2
   90 J=J-1
      IF(J.EQ.0)GO TO 120
      MM=MOD(NNN(KJ),(10**J))/(10**(J-1))
      IF(MM.EQ.0)GO TO 90
      LI=0
   92 LI=LI+1
      IF(KJ.LE.(340*LI))GO TO 95
      MM=MM+4
      GO TO 92
   95 KONT=KONT+1
      FR(KONT)=FFR(MM)
      T(KONT)=TT(MM)
      KFT(JJ)=FR(KONT)
      KFT(JJ+1)=T(KONT)
      JK=JJ+1
  110 CONTINUE
      KKONT=KKONT+1
  120 WRITE(6,3)KKONT,KJ,(KFT(J),J=1,JK)
    3 FORMAT(1X,2I6,8F12.3)
      IF(KONT.GE.5000)GO TO 70
      IF(KKONT.LT.JI)GO TO 50
   70 JJJ=KONT
      CALL DECOD(FR,T,JJJ)
      RETURN
      END
```

① ricerca di 20 freq. e 20 tempi

② ricerca numero di disposizioni da realizzare

~~ricerca del numero di elementi ... ciascuna disposizione~~ ricerca del numero d'ordine della disposizione da realizzare

costruzione della disposizione

stampa e controlli

CALMUS - serie fondamentale ... ordinamento ... Alfa automatico

NP(2)	(4)	(6)	8

```
C TEXT PROGRAM FOR AT/1                                                  AT/00010
      DIMENSION FR(288),NP(4),KFR(288)                                   AT/00020
      WRITE(6,1)                                                         AT/00030
    1 FORMAT(1X,0BATTI UN NUMERO DI 8 CIFRE0)                            AT/00040
      READ(5,2)N1,N2                                                     AT/00050
    2 FORMAT(2I4)                                                        AT/00060
      N=0                                                                AT/00070
   10 N=N+1                                                              AT/00080
      N2=N2*23                                                           AT/00090
      N1=(N1*23)+(N2/10000)                                              AT/00100
      N2=IABS(MOD(N2,10000)-(N1/10000))                                  AT/00110
      IF(N2.LE.0)N2=101                                                  AT/00120
      N1=MOD(N1,10000)                                                   AT/00130
      IF(N1.LE.0)N1=101                                                  AT/00140
      NP(1)=N1/100                                                       AT/00150
      NP(2)=MOD(N1,100)                                                  AT/00160
      NP(3)=N2/100                                                       AT/00170
      NP(4)=MOD(N2,100)                                                  AT/00180
      FR(N)=FLOAT(NP(1))*FLOAT(NP(2))/2.+30.                             AT/00190
      IF(N.EQ.288)GO TO 20                                               AT/00200
      GO TO 10                                                           AT/00210
   20 WRITE(6,21)FR                                                      AT/00220
   21 FORMAT(1X,8(F10.3,4X))                                             AT/00230
      N=0                                                                AT/00240
   30 N=N+1                                                              AT/00250
      X=1.                                                               AT/00260
   31 X=X*2.                                                             AT/00270
      IF(FR(N).LE.(22.*X))GO TO 32                                       AT/00280
      GO TO 31                                                           AT/00290
   32 XFR=22.*X                                                          AT/00300
      K=-1                                                               AT/00310
      RX=2.**(1./36.)                                                    AT/00320
   33 K=K+1                                                              AT/00330
      R=RX**K                                                            AT/00340
      YFR=XFR/R                                                          AT/00350
      IF(FR(N).GE.YFR)GO TO 34                                           AT/00360
      GO TO 33                                                           AT/00370
   34 IF(((YFR*RX)/FR(N)).LT.(FR(N)/YFR))GO TO 35                        AT/00380
      FR(N)=YFR                                                          AT/00390
      KFR(N)=K                                                           AT/00400
      GO TO 36                                                           AT/00410
   35 FR(N)=YFR*RX                                                       AT/00420
      KFR(N)=K-1                                                         AT/00430
   36 IF(N.GE.288)GO TO 40                                               AT/00440
      GO TO 30                                                           AT/00450
   40 WRITE(6,50)(KFR(J),FR(J),J=1,288)                                  AT/00460
   50 FORMAT(1X,5(I2,3X,F10.3,4X))                                       AT/00470
      STOP                                                               AT/00480
      END                                                                AT/00490
```

AT/1

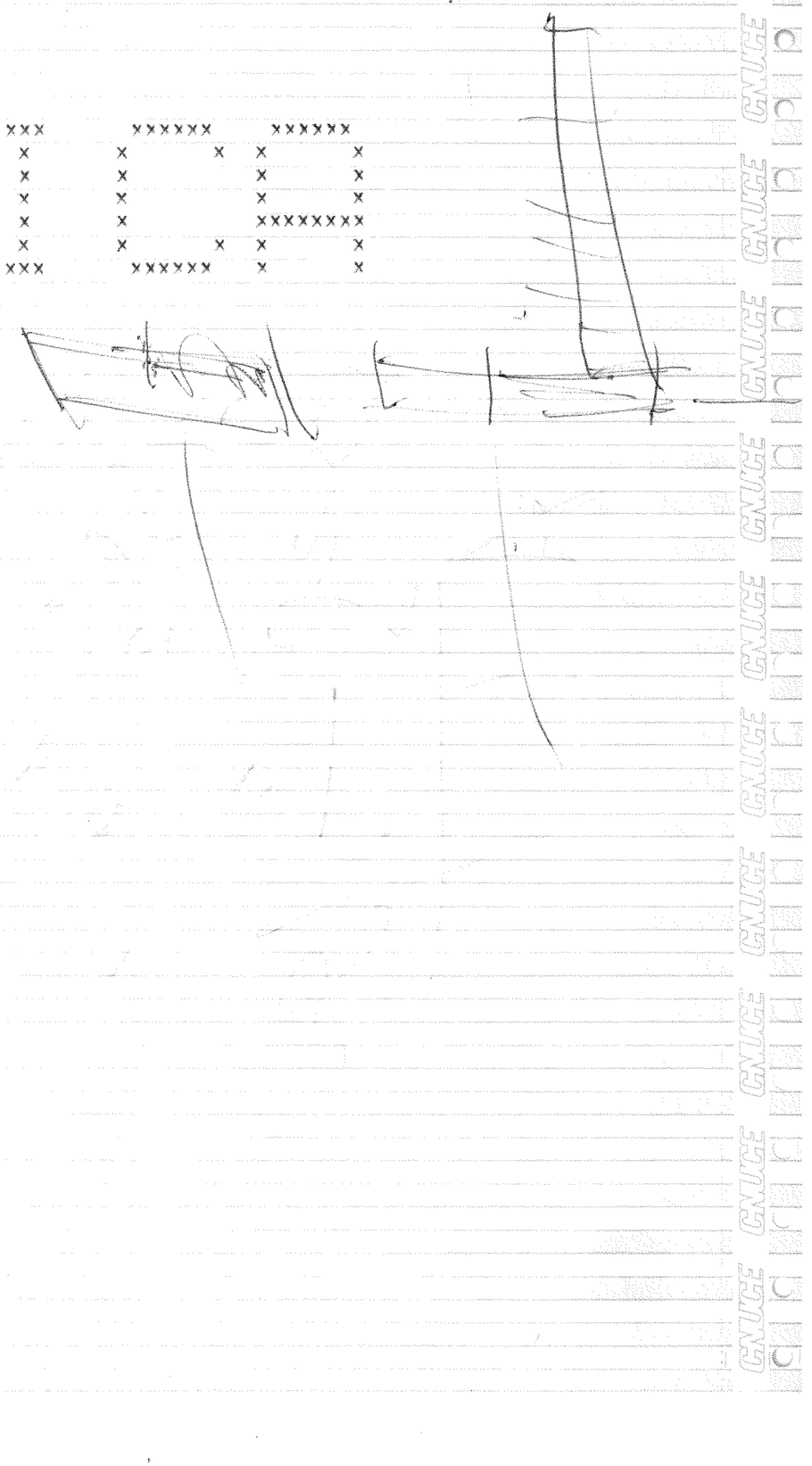
generazione dei suoni
con la $\sqrt[36]{2}$

```
      DIMENSION FR(360),FR1(10),N(10)                                   SCA00010
      L=0                                                               SCA00020
      R=2.**(1./36.)                                                    SCA00030
      FR(360)=32852.                                                    SCA00040
      DO 10 I=2,360                                                     SCA00050
      K=360+1-I                                                         SCA00060
   10 FR(K)=FR(K+1)/R                                                   SCA00070
   19 L=L+1                                                             SCA00080
      K=0                                                               SCA00090
      DO 20 J=L,360,36                                                  SCA00100
      K=K+1                                                             SCA00110
      FR1(K)=FR(J)                                                      SCA00120
   20 N(K)=J                                                            SCA00130
      WRITE(8,1)(N(I),FR1(I),I=1,10)                                    SCA00140
    1 FORMAT(9(I4,F8.2),I4,F9.2)                                        SCA00150
      IF(L.GE.36)GO TO 25                                               SCA00160
      GO TO 19                                                          SCA00170
   25 DO 30 I=1,360                                                     SCA00180
      I3=I                                                              SCA00190
      DO 32 I1=1,7                                                      SCA00200
      FRX=FR(I)*FLOAT(I1)                                               SCA00210
      WRITE(8,3)FRX                                                     SCA00220
    3 FORMAT(1X,F10.3)                                                  SCA00230
      DO 34 I2=I3,360                                                   SCA00240
      IF(FR(I2)-FRX)34,50,54                                            SCA00250
   54 R1=FR(I2)/FRX                                                     SCA00260
      R2=FRX/FR(I2-1)                                                   SCA00270
      IF(R2-R1)56,50,50                                                 SCA00280
   50 N(I1)=I2                                                          SCA00290
      I3=I2                                                             SCA00300
      FR1(I1)=FR(I2)                                                    SCA00310
      GO TO 32                                                          SCA00320
   56 N(I1)=I2-1                                                        SCA00330
      FR1(I1)=FR(I2-1)                                                  SCA00340
      I3=I2-1                                                           SCA00350
      GO TO 32                                                          SCA00360
   34 CONTINUE                                                          SCA00370
   32 CONTINUE                                                          SCA00380
      WRITE(8,2)(N(J),FR1(J),J=1,7)                                     SCA00390
    2 FORMAT(7(I4,1(',',F8.2,')')))                                     SCA00400
   30 CONTINUE                                                          SCA00410
      END                                                               SCA00420
                                                                        SCA00430
```

```
CP67USER ID   MUSICA       09/16/72     10.04.28
```

```
 XXXXXXX     XXXXXX     XXXXXX     XXXXXX
 X       X   X    X     X    X     X    X
 X       X   X    X     X    X     X    X
 X       X   XXXXXXX   X    XX    X    X   XX   X
 XXXXXXX             X   X    X   X    X        X
 X           X       X   X    X   X    X        X
 X             XXXXXX     XXXXXX     XXXXXX

 X       X   X       X   XXXXXX      XXX       XXXXXX     XXXXXX
 XX     XX   X       X   X       X     X       X      X   X      X
 X X   X X   X       X   X             X       X      X   X      X
 X  XX  X   X       X   XXXXXX        X       X      X   X      X
 X      X   X       X         X       X       X      X   XXXXXXXX
 X      X   X       X   X     X       X       X      X   X      X
 X      X   XXXXXX      XXXXXX        XXX       XXXXXX     X      X
```



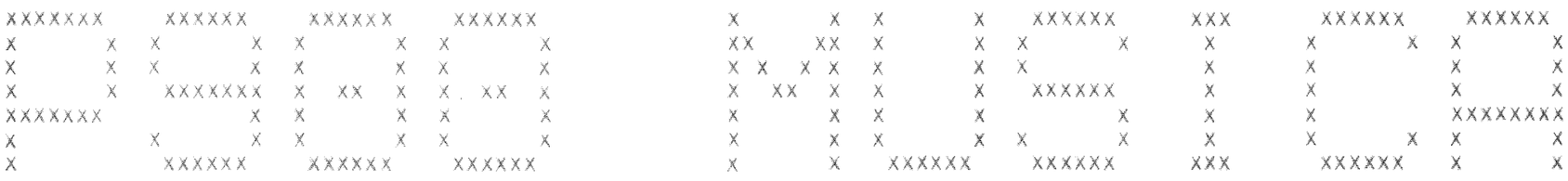
		OTTAVE															
		I		II		III		IV		V		VI		VII		VIII	
DO(C)	1	32.70	37	65.40	73	130.80	109	261.60	145	523.20	181	1046.40	217	2092.80	253	4185.60	
	2	33.34	38	66.67	74	133.34	110	266.69	146	533.37	182	1066.74	218	2133.49	254	4266.97	
	3	33.98	39	67.97	75	135.94	111	271.87	147	543.74	183	1087.48	219	2174.96	255	4349.92	
REb(Df)	4	34.64	40	69.29	76	138.58	112	277.16	148	554.31	184	1108.62	220	2217.24			
	5	35.32	41	70.64	77	141.27	113	282.54	149	565.09	185	1130.17	221	2260.35			
	6	36.00	42	72.01	78	144.02	114	288.04	150	576.07	186	1152.15	222	2304.29			
RE(D)	7	36.70	43	73.41	79	146.82	115	293.64	151	587.27	187	1174.54	223	2349.09			
	8	37.42	44	74.84	80	149.67	116	299.34	152	598.69	188	1197.38	224	2394.76			
	9	38.15	45	76.29	81	152.58	117	305.16	153	610.33	189	1220.66	225	2441.31			
MIb(Ef)	10	38.89	46	77.77	82	155.55	118	311.10	154	622.19	190	1244.39	226	2488.77			
	11	39.64	47	79.29	83	158.57	119	317.14	155	634.29	191	1268.58	227	2537.16			
	12	40.41	48	80.83	84	161.65	120	323.31	156	646.62	192	1293.24	228	2586.48			
MI(E)	13	41.20	49	82.40	85	164.80	121	329.60	157	659.19	193	1318.38	229	2636.76			
	14	42.00	50	84.00	86	168.00	122	336.00	158	672.01	194	1344.01	230	2688.02			
	15	42.82	51	85.63	87	171.27	123	342.53	159	685.07	195	1370.14	231	2740.28			
FA(F)	16	43.65	52	87.30	88	174.60	124	349.19	160	698.39	196	1396.78	232	2793.55			
	17	44.50	53	89.00	89	177.99	125	355.98	161	711.97	197	1423.93	233	2847.86			
	18	45.36	54	90.73	90	181.45	126	362.90	162	725.81	198	1451.61	234	2903.23			
SOLb(Gf)	19	46.24	55	92.49	91	184.98	127	369.96	163	739.92	199	1479.83	235	2959.67			
	20	47.14	56	94.29	92	188.58	128	377.15	164	754.30	200	1508.60	236	3017.20			
	21	48.06	57	96.12	93	192.24	129	384.48	165	768.97	201	1537.93	237	3075.86			
SOL(G)	22	48.99	58	97.99	94	195.98	130	391.96	166	783.91	202	1567.83	238	3135.66			
	23	49.95	59	99.89	95	199.79	131	399.58	167	799.15	203	1598.31	239	3196.62			
	24	50.92	60	101.84	96	203.67	132	407.34	168	814.69	204	1629.38	240	3258.76			
LAb(Af)	25	51.91	61	103.82	97	207.63	133	415.26	169	830.53	205	1661.06	241	3322.11			
	26	52.92	62	105.83	98	211.67	134	423.34	170	846.67	206	1693.35	242	3386.70			
	27	53.95	63	107.89	99	215.78	135	431.57	171	863.13	207	1726.27	243	3452.54			
LA(A) →	28	54.99	64	109.99	100	219.98	136	439.96	172	879.91	208	1759.83	244	3519.66			
	29	56.06	65	112.13	101	224.26	137	448.51	173	897.02	209	1794.04	245	3588.08			
	30	57.15	66	114.31	102	228.61	138	457.23	174	914.46	210	1828.92	246	3657.84			
SIb(Bf)	31	58.26	67	116.53	103	233.06	139	466.12	175	932.24	211	1864.47	247	3728.95			
	32	59.40	68	118.79	104	237.59	140	475.18	176	950.36	212	1900.72	248	3801.44			
	33	60.55	69	121.10	105	242.21	141	484.42	177	968.84	213	1937.67	249	3875.34			
SI(B)	34	61.73	70	123.46	106	246.92	142	493.83	178	987.67	214	1975.34	250	3950.68			
	35	62.93	71	125.86	107	251.72	143	503.44	179	1006.87	215	2013.74	251	4027.48			
	36	64.15	72	128.31	108	256.61	144	513.22	180	1026.45	216	2052.89	252	4105.78			

```
C TEXT PROGRAM FOR AT/1
      DIMENSION FR(288),NP(4),KFR(288)
      WRITE(6,1)
    1 FORMAT(1X,0BATTI UN NUMERO DI 8 CIFRE0)
      READ(5,2)N1,N2
    2 FORMAT(2I4)
      N=0
   10 N=N+1
      N2=N2*23
      N1=(N1*23)+(N2/10000)
      N2=IABS(MOD(N2,10000)-(N1/10000))
      IF(N2.LE.0)N2=101
      N1=MOD(N1,10000)
      IF(N1.LE.0)N1=101
      NP(1)=N1/100
      NP(2)=MOD(N1,100)
      NP(3)=N2/100
      NP(4)=MOD(N2,100)
      FR(N)=FLOAT(NP(1))*FLOAT(NP(2))/2.+30.
      IF(N.EQ.288)GO TO 20
      GO TO 10
   20 WRITE(6,21)FR
   21 FORMAT(1X,8(F10.3,4X))
      N=0
   30 N=N+1
      X=1.
   31 X=X*2.
      IF(FR(N).LE.(22.*X))GO TO 32
      GO TO 31
   32 XFR=22.*X
      K=-1
      RX=2.**(1./36.)
   33 K=K+1
      R=RX**K
      YFR=XFR/R
      IF(FR(N).GE.YFR)GO TO 34
      GO TO 33
   34 IF(((YFR*RX)/FR(N)).LT.(FR(N)/YFR))GO TO 35
      FR(N)=YFR
      KFR(N)=K
      GO TO 36
   35 FR(N)=YFR*RX
      KFR(N)=K-1
   36 IF(N.GE.288)GO TO 40
      GO TO 30
   40 WRITE(6,50)(KFR(J),FR(J),J=1,288)
   50 FORMAT(1X,5(I2,3X,F10.3,4X))
      STOP
      END
```

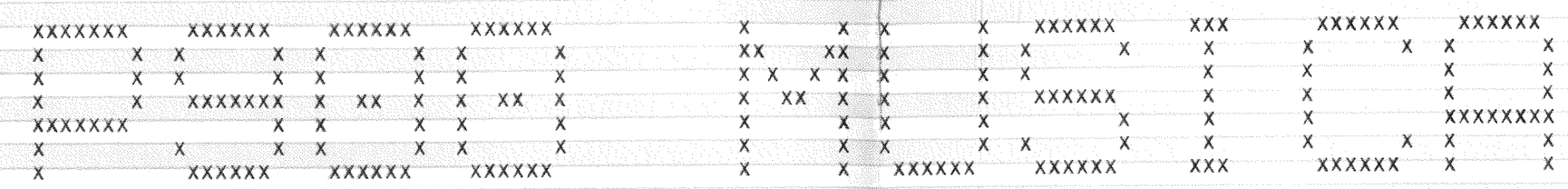
rettifica valori frequenziali ~~nell'ambito~~ secondo la $\sqrt[36]{2}$

AT/2

CP67USERID MUSICA   12/13/71   14.24.51



CP67USERID MUSICA   11/25/71   14.58.42



```
C TWO VOICES RANDOM MUSIC                                              AT/00010
      DIMENSION NP(8),KTT(1000)                                        AT/00020
      K=0                                                              AT/00030
      KONT=1                                                           AT/00040
      WRITE(6,1)                                                       AT/00050
    1 FORMAT(1X,'BATTI 8 CIFRE')                                       AT/00060
      READ(5,3)N1,N2                                                   AT/00070
    3 FORMAT(2I4)                                                      AT/00080
1000  N2=N2*23                                                         AT/00090
      N1=(N1*23)+(N2/10000)                                            AT/00100
      N2=IABS(MOD(N2,10000)-(N1/10000))                                AT/00110
      IF(N2.LE.0)N2=KONT                                               AT/00120
      N1=MOD(N1,10000)                                                 AT/00130
      IF(N1.LE.0)N1=KONT                                               AT/00140
      L=0                                                              AT/00150
      NX=N1                                                            AT/00160
      GO TO 9                                                          AT/00170
    8 NX=N2                                                            AT/00180
    9 DO 10 I=1,4                                                      AT/00190
      L=L+1                                                            AT/00200
      KD=10**(4-I+1)                                                   AT/00210
      NX=MOD(NX,KD)                                                    AT/00220
   10 NP(L)=NX/(KD/10)                                                 AT/00230
      IF(L.NE.8)GO TO 8                                                AT/00240
      IF(K.EQ.1)GO TO 52                                               AT/00250
      KFR1=NP(1)*10+NP(2)                                              AT/00260
   15 IF(KFR1.LE.35)GO TO 20                                           AT/00270
      KFR1=KFR1-36                                                     AT/00280
      GO TO 15                                                         AT/00290
   20 KOT1=NP(3)                                                       AT/00300
   25 IF(KOT1.LE.7)GO TO 30                                            AT/00310
      KOT1=KOT1-8                                                      AT/00320
      GO TO 25                                                         AT/00330
   30 INT1=NP(4)*10+NP(5)                                              AT/00340
   35 IF(INT1.LE.15)GO TO 40                                           AT/00350
      INT1=INT1-16                                                     AT/00360
      GO TO 35                                                         AT/00370
   40 KT1=NP(6)*10+NP(7)                                               AT/00380
   45 IF(KT1.LE.31)GO TO 50                                            AT/00390
      KT1=KT1-31                                                       AT/00400
      GO TO 45                                                         AT/00410
   50 KKFR1=KFR1*(2**20)                                               AT/00420
      KKOT1=KOT1*(2**17)                                               AT/00430
      KINT1=INT1*(2**13)                                               AT/00440
      IF(K.EQ.2)GO TO 91                                               AT/00450
   52 KFR2=NP(8)*10+NP(1)                                              AT/00460
   55 IF(KFR2.LE.35)GO TO 60                                           AT/00470
      KFR2=KFR2-36                                                     AT/00480
      GO TO 55                                                         AT/00490
   60 KOT2=NP(2)                                                       AT/00500
   65 IF(KOT2.LE.7)GO TO 70                                            AT/00510
      KOT2=KOT2-8                                                      AT/00520
      GO TO 65                                                         AT/00530
   70 INT2=NP(3)*10+NP(4)                                              AT/00540
   75 IF(INT2.LE.15)GO TO 80                                           AT/00550
```

~~WRITE(6,5) KT1~~
~~5 FORMAT(5X,I2)~~
50 NT1 = KT1

```
      INT2=INT2-16                                                    AT/00560
      GO TO 75                                                        AT/00570
   80 KT2=NP(5)*10+NP(6)                                              AT/00580
   85 IF(KT2.LE.31)GO TO 90                                           AT/00590
      KT2=KT2-31                                                      AT/00600
      GO TO 85                                                        AT/00610
   90 KKFR2=KFR2*(2**7)                                               AT/00620
      KKOT2=KOT2*(2**4)                                               AT/00630
   91 IF(KT1.LT.KT2)GO TO 95                                          AT/00640
      IF(KT1.NE.KT2)GO TO 92                                          AT/00650
      K=0                                                             AT/00660
      GO TO 100                                                       AT/00670
   92 KT1=KT1-KT2                                                     AT/00680
      K=1                                                             AT/00690
      KTX=KT2                                                         AT/00700
      GO TO 102                                                       AT/00710
   95 KT2=KT2-KT1                                                     AT/00720
      K=2                                                             AT/00730
  100 KTX=KT1                                                         AT/00740
  102 KTX=KTX*(2**26)                                                 AT/00750
      WRITE(6,2)KTX,KOT1,KFR1,INT1,KOT2,KFR2,INT2                     AT/00760
    2 FORMAT(1X,I2,2(5X,3I3))                                         AT/00770
      KONT=KONT+1                                                     AT/00780
      IF(KONT.EQ.1001)STOP                                            AT/00790
      GO TO 1000                                                      AT/00800
      END                                                             AT/00810
```