Pose en libre $\text{pgcd}(|[A0]|, |[A1]|)$ (a, b)

$\text{pgcd}(x,0) = x$ Algorithme L (Knuth p 329)

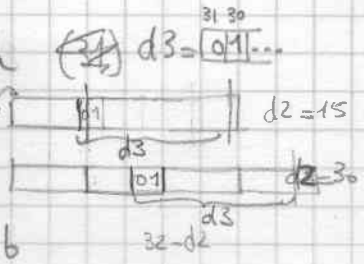

```
TT\XPGCD:MOVE.L  A0,A4
         MOVE.L  A1,A5
         BSR     XCMP1
         MOVE.L  A4,A0
         MOVE.L  A5,A1
         BEQ     XPOSE1      → pgcd(±a,±a) = |a|
         BCC     \1
         EXG     A0,A1
\1:      MOVE    (A1),d1
         CMP     #$4000,d1   → pgcd(±a,0) = a
         BEQ     XPOSE1
         AND     #$5FFF,d1
         MOVEQ   #0,D2       k  nb de mots nuls terminaux
                             communs à a et b
         BCLR    #14,d1
         BNE     \2
         LEA     2(A1,d1.W),A5      ⊗
         MOVE    (A0),d0
         AND     #$1FFF,d0
         LEA     2(A0,d0.W),A4      ⊗
         MOVE.L  A5,D2
\0:      TST     -(A5)
         BNE     \1                 MOVE
         TST     -(A4)
         BEQ     \0
\1:      ADDQ    #2,A5
         SUB.L   A5,D2
\2:      MOVE    D2,-(SP)           mis en réserve jusqu'à la fin
         MOVE.L  A6,-(SP)

         BSR     \95        |a 2^-8k|
         MOVE.L  A1,A0
         BSR     \95        |b 2^-8k|

:        MOVE.L  A2,A1
         MOVE.L  (SP),A0
```

comme avant

```
\2:MOVEQ  #0,D0                 teste si mots longs
   MOVE   (A0),D0
   BCLR   #14,D0
   BNE    \5                    → mots
   CMP    #4,D0
   BGT    \3                    → multiprécision
   BEQ    \4                    → L
   MOVE   2(A0),d0              ↓ W
   BRA    \5
\3:MOVE.L A1,-(SP)              cas multiprécision
   MOVE   (A1),D1
   BCLR   #14,D1
   BNE    \35                   → division
   BFFFO  (A0),16,0,D2
               offset width (=32)
   SUBQ.L #1,d2                 } les 31
   BFEXTU (A0),D2,0,D3          } leading bits of a     d3 = 0 1 ...
                  32 wide         (ex si A0
   SUB    D1,D0
   BNE    \30
   BFEXTU (A1),D2,0,D1          ) le début de b
   BRA    \3A
\30:SUBQ  #2,D0
   BNE    \31
   MOVE.L 2(A1),D1              ) le début de b
   BRA    \32
\31:SUBQ  #2,D0
   BNE    \35                   → division
   MOVEQ  #0,D1
   MOVE   2(A1),D1
\32:MOVEQ #32,d0
   SUB    D2,D0
   LSR.L  D0,D1
```



```
\3A:MOVEQ #1,d0
    MOVEQ #0,d2
    MOVEQ #0,d4
    MOVEQ #1,d5
\3B:MOVEM.L D1/D3,-(SP)
    ADD.L  D4,D1        d1 = v̂ + C
    BEQ    \3C          → fin
    ADD.L  D0,D3        d3 = û + A
    DIVU.L D1,D3
    MOVE.L D3,D6        d6 = q
    MOVEM.L (SP),D1/D3
    ADD.L  D5,D1        d1 = v̂ + D
    BEQ    \3C          → fin
    ADD.L  D2,D3        d3 = û + B
    DIVU.L D1,D3
    CMP.L  D3,D6
    BNE    \3C          → fin

    MOVE.L D4,D1        d1 = C
    MULS.L D6,D1        d1 = qC
    SUB.L  D1,D0        d0 = A - qC
    EXG    D0,D4
    MOVE.L D5,D1        d1 = D
    MULS.L D6,D1        d1 = qD
    SUB.L  D1,D2        d2 = B - qD
    EXG    D2,D5
    MOVE.L (SP)+,D3     v̂
    MOVE.L (SP)+,D1     û
    MULS.L D3,D6        d6 = qv̂
    SUB.L  D6,D1        d1 = û - qv̂
    BRA    \3B
```

L-1

$\hat{u} = d3$
$\hat{v} = d1$
$A = d0$
$B = d2$
$C = d4$
$D = d5$

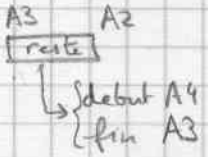
L2

L3

```
\3C:ADDQ #8,SP
    TST.L  D2
    BEQ    \35        → division
    MOVEM.L  D2/D4/D5,-(SP)
    BSR  XMDA  (30)22      Au
    MOVE.L  (SP)+,D0       B
    MOVE.L  A2,-(SP)       Au
    MOVE.L  12(SP),A0      v
    BSR  XMDA              } Bv
    MOVE.L  A2,A0          }
    MOVE.L  (SP)+,A1       Au
    BSR  XADDS1            Au+Bv
    MOVE.L  (SP)+,D0/D1    C et D
    MOVE.L  4(SP),A0       u   ⊗
    MOVEM.L D1/A2/A6,-(SP)
    BSR  XMDA              Cu
    MOVE.L  (SP)+,D0       D
    MOVE.L  A2,-(SP)       Cu
    MOVE.L  12(SP),A0      v
    BSR  XMDA              } Dv
    MOVE.L  A2,A0          }
    MOVE.L  (SP)+,A1       Cu
    BSR  XADDS1            Cu+Dv
    MOVE.L  A2,A4          début } ↓
    MOVE.L  A6,A3          fin   }
    MOVEM.L  (SP)+,A2/A6   ←(Au+Bv)
    ADDQ #4,SP
\34:MOVE.L  (SP),A0        u
    BSR  XLB76             nouveau u
    MOVE.L  A0,-(SP)
    MOVE.L  A4,A2
    MOVE.L  A3,A6
    BSR  XLB76
    MOVE.L  (SP)+,A1       nouveau v
    MOVE.L  (SP),A0
    CMP  #$4000,(A1)
    BNE  \2          ← MOVE.L A1,A6
    MOVE.L  (SP)+,A2
X   BRA  \J                → ×2  16k
```

cas division

```
\35 : MOVE.L  A0,A4
      MOVE.L  A1,A5
      BSR     TT\XDIV1A  ⟶
      MOVE.L  A3,A4
      MOVE.L  A3,A6  (fin de a1)
      MOVE.L  A2,A3
      MOVE.L  (SP)+,A2  début de a1
      BRA     \34
```



```
\4:MOVE.L 2(A0),D0
\5:MOVE   (A1)+,D1      <- MOVEQ #1,D3   ⊗
  AND.L  #$5FFF,D1
  BCLR   #14,D1
  BNE    \7
  CMP    #4,d1
  BNE    \6
  MOVE.L (A1),d1
  BRA    \7
\6:MOVE   (A1),d1       <- MOVEQ #1,D3
\7:DIVUL.L D1,D2,D0     divise d0 par d1   r=d2  q=d0
  MOVE.L  D1,D0
  MOVE.L  D2,D1
  CMP.L   D3,D1
  BHI     \7            si r>1
  BNE     \8            -> si r=0
  MOVEQ #1,D0           si r=1
\8 :MOVE.L (SP)+,A6
  BSR   XPOSEL
\9:MOVE (SP)+,D2                          termine
  BEQ   \92             -> fin si k=0
  MOVE  (A2),D0                  multiplie par 2^k  k=D2>0
  BCLR  #14,D0
  BEQ   \91
  MOVE  D0,(A6)+
  MOVEQ #2,D0
\91:ADD  D2,D0
  MOVE  D0,(A2)
\92:RTS

  BNE   GD64\A
  RTS
```

Pose $|[A_0]| * 2^{-8k}$ où $k = D2.W > 0$

Nota : on peut avoir une forme non standard [2 | n]

(SP)

```
195:BSR  XPOSE1        |[A0]|        ; détruit D0, A3, A4
     TST  D2                          ; met A2/A6
     BEQ  196          → fin
     SUB  D2,(A2)
     SUB  D2,A6
196:RTS
```