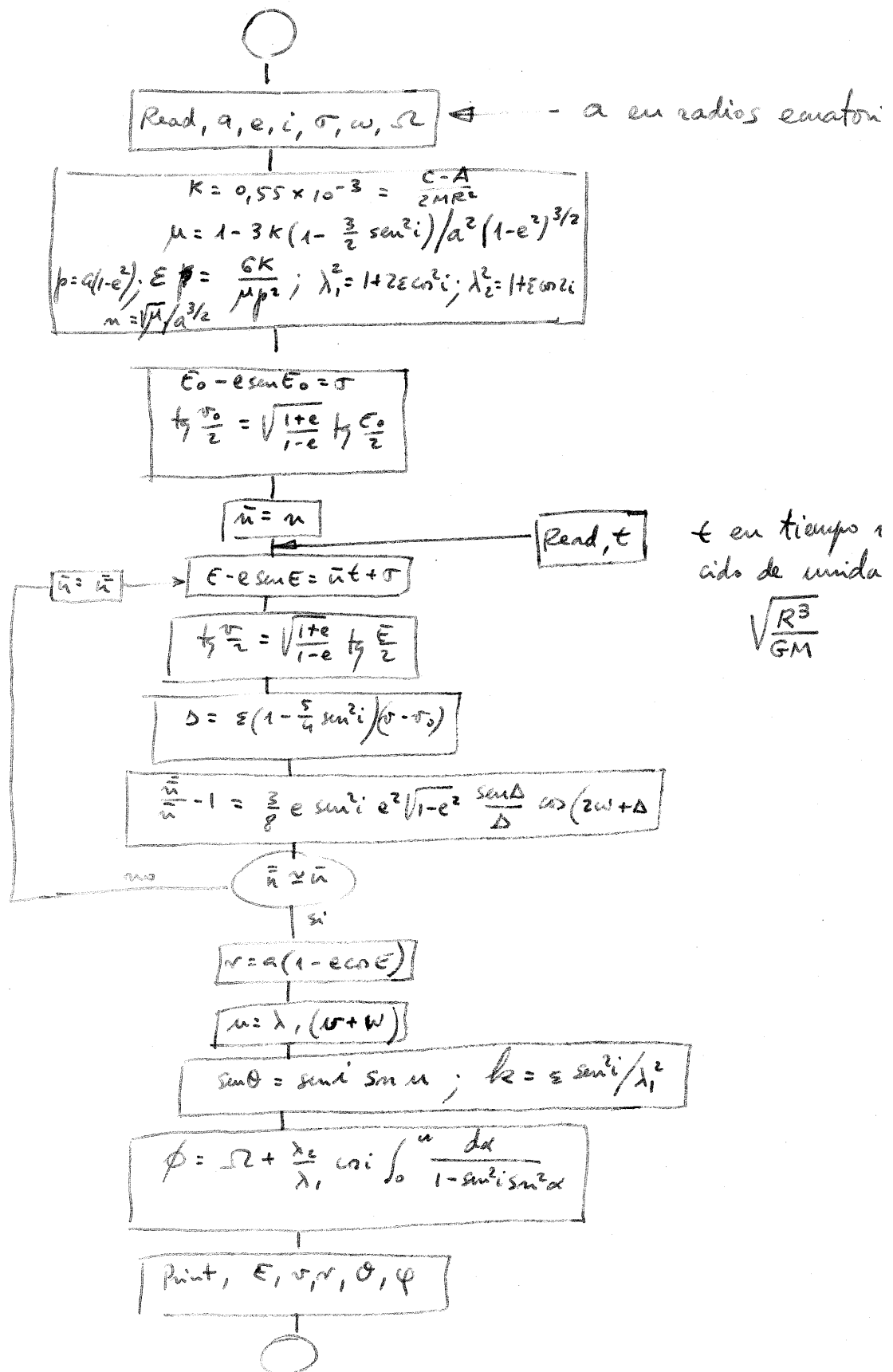




Nota: si no se utilizan las unidades indicadas hay que tomar las siguientes fórmulas:

$$\mu = \frac{GM}{a^3} (1 - 3KR^2 \dots) / \dots$$

$$E = \frac{6KR^2 \sqrt{GM}}{\mu p^2}$$

$$ma^3 = \mu GM$$

o sea:

1) sustitución de k por kR^2

2) sustitución de μ por μGM en
 $ma^3 = \mu$

C... MV 670723

C... MOVIMIENTO SATELITES ARTIFICIALES 7

C... ~~PARA~~ PARA BARCELONA

C... DATOS SATELITE

$$CONS = .00054145 \quad (.00055) * 40.589641$$

IF (SENSE SWITCH 1) 5, 10

5 READ, T ϕ , Q, EX, ZM, SIG, ϕ MGA, AN ϕ D

$$A = Q / (1 - EX)$$

$$P = Q * (1 + EX)$$

$$E2 = EX + EX$$

$$S1 = \sin(ZM)$$

$$ES4 = 1.25 * EX * EX$$

$$S2 = S1 * S1$$

$$C1 = \cos(ZM)$$

$$UM = 1 - 3 * CONS * (1 - 1.5 * S2) / (A * A * (1 - EX * EX) ** 1.5)$$

$$ENE = 1723.4580 * \sqrt{UM / A} / A$$

$$EPS = 6 * CONS / (P * P * UM)$$

$$AL1 = 1 + 2 * EPS * C1 * C1$$

$$AK = EPS * S2 / AL1$$

$$AL1 = \sqrt{AL1}$$

$$AL2 = \sqrt{1 + EPS * (1 - S2 - S2)}$$

$$FF1 = .5 * EPS * C1 * (1 + 1.25 * EPS * (1 + 1.5 * S2))$$

$$FCH1 = 1 / (1 + AK * (.140625 + AK * .09765625))$$

$$PF1 = 6.2831853 * (1 + .5 * EPS * (1 - C1)) * AL2 / AL1$$

UNWAT

UNWAT

$$GK2 = 3.1415927 * (1 + AK * (.25 + AK * (.140625 + AK * .09765625)))$$

10 READ, TSGO

$$GK4 = GK2 + GK2$$

$$TSGO = TSGO + .03710279$$

$$L1 = 1$$

$$L2 = 2$$

READ, T, HORA, DT

$$DTS = 1.0027391 * DT$$

$$T = T + HORA / 24 - DT$$

$$TS = TSGO + 2 * HORA * 1.0027391 - DTS$$

$$15 T = T + DT$$

$$TS = TS + DTS$$

Handwritten signature/initials

$$CHI = FCHI * U$$

$$PSI = CHI + .125 * AK * SIN(CHI + CHI)$$

$$SPSI = COS(CHI)$$

$$SPSI = (1. + .25 * AK * SPSI * SPSI) * SIN(CHI)$$

$$SZ = SA * SPSI$$

$$Z = ATAN(SZ / SQRT(1. - SZ * SZ))$$

$$FI = PSI$$

$$G = 0.$$

$$W = SQRT(1. - SPSI * SPSI)$$

$$IF (ABS(PSI) - 1.5707963) 60, 65, 50$$

$$50 \quad G = 3.1415927$$

$$W = -W$$

$$IF (SPSI) 55, 65, 60$$

$$55 \quad G = -G$$

$$60 \quad FI = ATAN(C1 * SPSI / W) + G$$

$$65 \quad FI = ANGD + FI - FFI * PSI + S * PF1$$

$$W = FI$$

$$USE 6000$$

$$FI = W$$

C 11 COMPROBACION VISIBILIDAD

~~$$H = FI - ASE$$~~

$$X = R * COS(Z)$$

$$Y = R * SIN(Z)$$

$$CZS = Y * SEND + X * COSD * COS(FI - ASC)$$

$$W = SQRT(R * R - 40.589641)$$

$$IF (CZS + W) 70, 75, 75$$

$$70 \quad PRINT, T, LZ$$

$$GO TO 15$$

C.. CALCULO ASCENSION RECTA Y DECLINACION TOPOCENTRICA

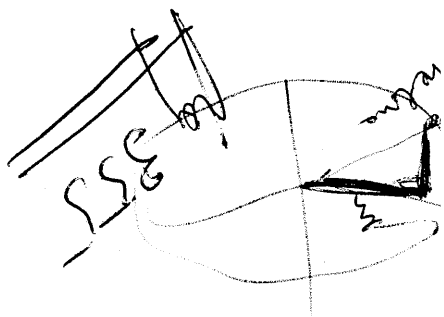
$$75 W = TS - FI$$

USE 6000

$$AR = W$$

$$X = R * \cos(Z)$$

$$Y = X * \sin(AR)$$



$$X = X * \cos(AR) - Z$$

$$Z1 = R * \sin(Z) - Z$$

$$R1 = X * X + Y * Y$$

$$D = \text{ATAN}(Z1 / \text{SQRT}(R1)) * 57.295780$$

$$AR = \text{ATAN}(Y / X)$$

$$\text{IF}(X) \ 80, 85, 85$$

$$80 \ AR = AR + 3.1415927$$

$$85 \ W = TS - AR$$

USE 6000

$$AR = W * 57.295780$$

$$R1 = \text{SQRT}(R1 + Z1 * Z1)$$

C.. CALCULO ACIMUT Y ALTURA

$$X1 = X * .66152747 - Z1 * .74992092$$

$$Z1 = X * .74992092 + Z1 * .66152747$$

$$H = \text{ATAN}(Z / \text{SQRT}(X1 * X1 + Y * Y)) * .57295780$$

$$AC = \text{ATAN}(Y / X1) * .57295780$$

$$\text{IF}(X1) \ 90, 95, 95$$

$$90 \ AC = AC + 3.1415927$$

$$95 \ W = TS - AC$$

USE 6000

$$AC = W * 57.295780$$

$$FI = FI * 57.295780$$

$$Z = Z * 57.295780$$

PRINT, T, R, FI, Z, R1, AR, D, AC, H

GO TO 15

6000

Unidades : $\begin{cases} \text{Mm} \\ \text{Días} \\ \text{Radianes} \end{cases}$

$Q : q$, Radio vector perigeo (Mm)

$EX : e$, excentricidad

$EM : i$, inclinación órbita (rad.)

$SIG : \sigma$, anomalía en la época (rad)

$OMGA : \omega$, argumento de declinación perigeo (rad)

$ANOD : \Omega$, Argumento ascension recta Nodo ascendente (rad)

$T_0 : t_0$, Época constante (en días y fracción a partir 1968,0)

$TSGO : t_{mco}$: Tiempo sideral en Greenwich $\approx 0^{\circ} \text{ T.U.}$

T : Días enteros a partir de 1968,0 $\uparrow$

$HORA : t$ tiempo universal T.U. en horas y fracción

RESULTADOS

T : hora

R : distancia geocéntrica satélite

FI : Ascension recta " "

Z : Declinación " "

R_1 : distancia topocéntrica " "

AR : Ascension recta " "

D : Declinación topocéntrica " "

AC : azimuth

H : altura angular sobre el horizonte

CONSTANTES NUMERICAS

6

De Barcelona :

4p.

$$\lambda, \text{ Longitud} : 8^{\text{m}} 38,0^{\text{s}} \text{ E} = -0.03710279$$

$$\varphi, \text{ Latitud} : 41^{\circ} 24' 10'' \text{ N} = .72261478$$

$$\cos \varphi = .74992092$$

$$\sin \varphi = .66152747$$

$$\rho = \text{Radio } g \text{ Distancia a centro Tierra} =$$

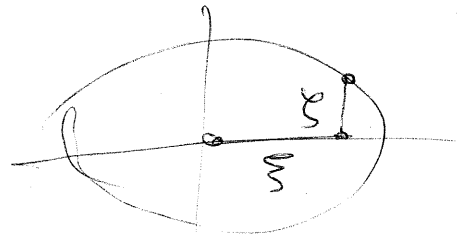
$$\text{Constante de Gauss} : 1723.4580 \text{ Mm}^{3/2} \text{ dia}^{-1}$$

$$\cos \varepsilon = .91733029$$

$$\sin \varepsilon = .39812704$$

$$\sin 12^{\circ} = .20791168$$

$$\text{BARCELONA} \left\{ \begin{array}{l} \xi = 4.7926095 \text{ Mm} \\ \eta = 4.1947984 \text{ Mm} \\ g = .99853528 \quad a = 6.3690454 \end{array} \right.$$



~~$$6356701345$$~~

$$63248$$

$$T_0 = t_0$$

EX-102
EX-102

L2. aux.

hours

$$\frac{\text{HORA}}{T_1} = T - T_0$$

T_0 época contante satelite a panti de 1968,0

ASC : A₀



$$\cos D = \cos D$$

$$21 \text{ } \text{[scribble]} = \omega z_0$$

$$17 = 110$$

OBSERVADOR

(R) = ^{geocentrics} determine geocentric satellite

(

M n° vuelta

$\text{CHI} = \chi$ *ángulo auxiliar*

$\psi = \text{angle aux. hai}$

$$\sin \psi = \sin \psi$$

$$S_2 = \sin^{-1} D_5$$

$$\textcircled{7} = D_2$$

⑧ FI = AS

$G = \max. \text{Wm}$

PUNTO SUBSATELITE

$$H\cancel{H} = H''$$

$$C_{25} = \cos z''$$

$$W = \cos z''_0 \quad (9)$$

TOPOCENTRICO (OBSERVADOR,

$$\textcircled{AR} = A'_5$$

Y

5

Y

R_1 distancia topocentrica

HA : D