



INTEROFFICE CORRESPONDENCE


TO: G. R. Shook

cc: Distribution

71:7252.9-2

DATE: 5 January 1971

SUBJECT: Tables and Flow Charts for Preliminary  
Release of FP8

  
FROM: C. G. Gibson

BLDG. H4 ROOM 2102 EXT. 2455

- 
- References: 1. "LM AGS Programmed Equations Document, Flight Program 7,"  
December 1969.
2. G. R. Shook, "AGS FP-8 Configuration Summary," TRW  
No. 70:7250.GRS-57, 5 October 1970.

The attached Tables and Flow Charts are being provided to you for inclusion with other information for the Preliminary Release of Flight Program 8. These Flow Charts will be modified slightly to conform to the format previously used for the LM AGS Programmed Equations Documents. They will be incorporated into the Programmed Equations Document for Flight Program 8.

The contents of these Flow Charts do accurately represent the equations as they presently exist in the Flight Program 8 - LM AGS FP8 S03 4039 assembly dated 18 December 1970.

Approved: 

W. J. Klenk, Manager  
Systems Analysis & Software Dept.

CGG:pw

Attachment

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Page 2

Distribution:

TRW/HO

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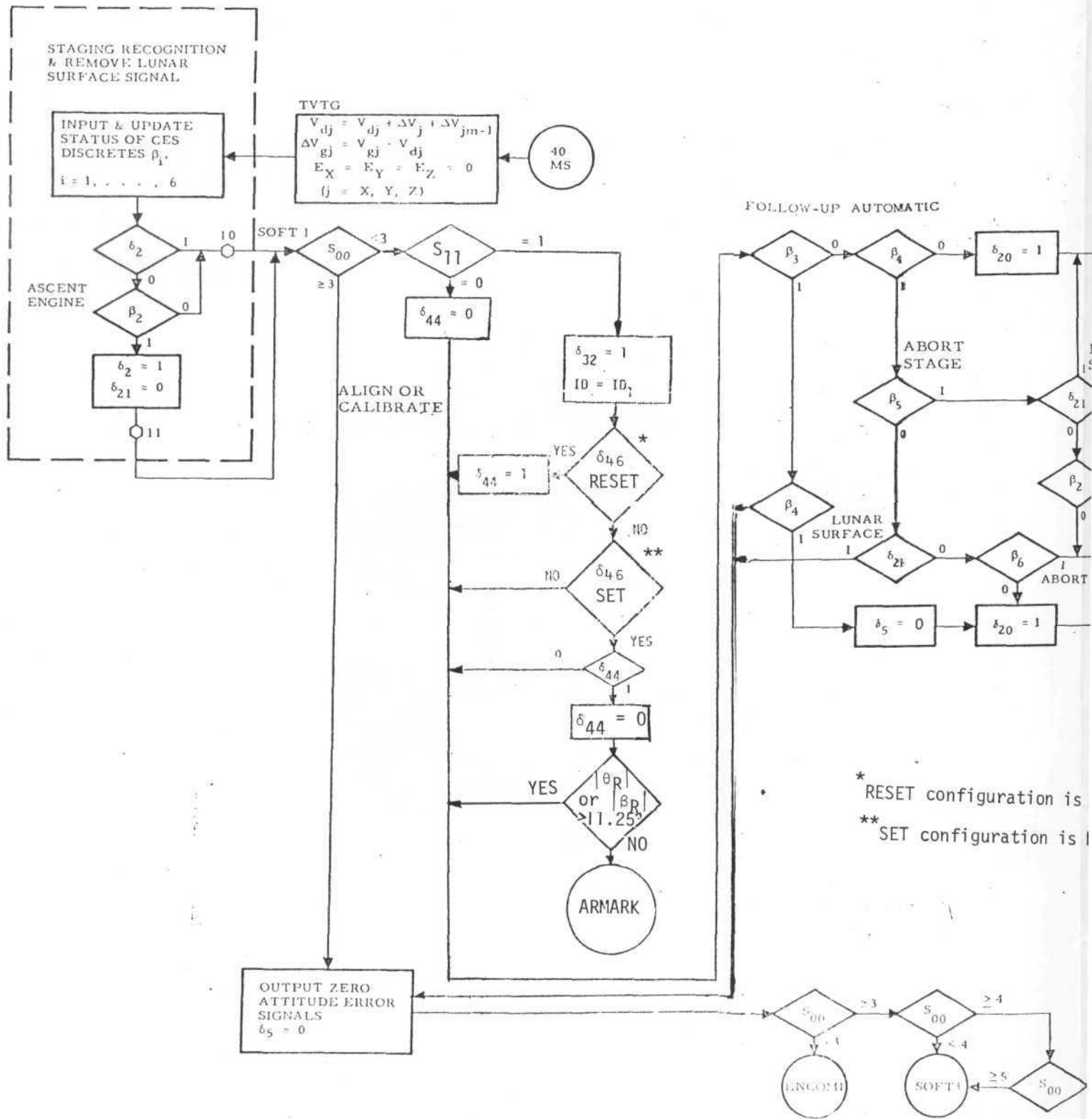
TRW/FLA

J. Thomas  
B. Warren

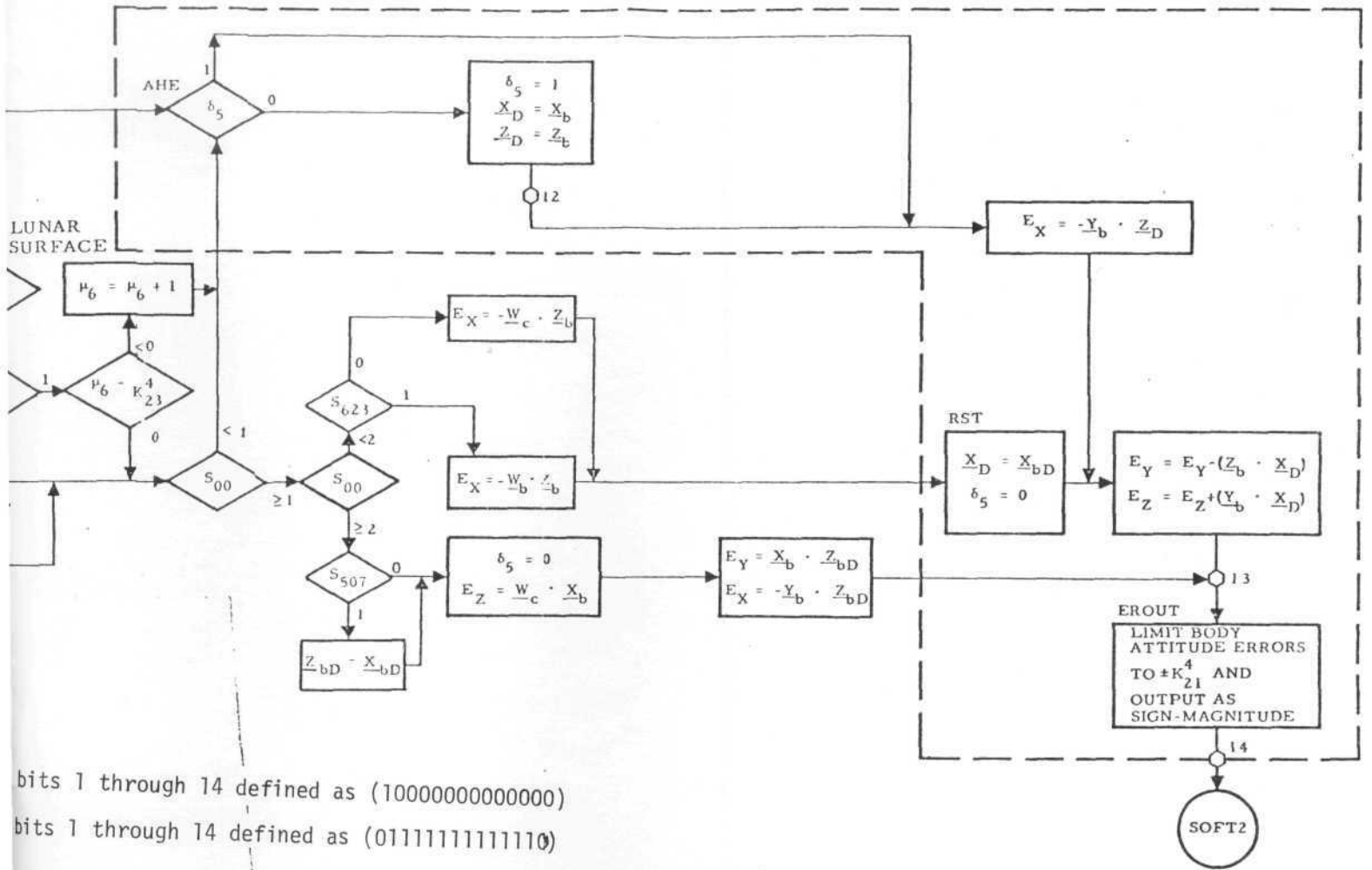
## FP-8 NEW VARIABLE DEFINITIONS

$S_{11}$	= 0	No automatic RR from PGNCs downlink
	= 1	Automatic RR from PGNCs downlink
$\delta_{44}$	= 0	PGNCs downlink good discrete ( $\delta_{46}$ ) not yet reset since last update
	= 1	$\delta_{46}$ already reset since last update
$\delta_{45}$	= 0	range update next
	= 1	range rate update next
$\delta_{46}$	bit 0 = 0	low range scaling
	bit 0 = 1	high range scaling
	bit 1-14 set	good PGNCs downlink data received (01111111111110)
	bit 1-14 reset	Downlink data reset flag from PGNCs (10000000000000)
$K_{11}^6$		Angle scaling factor
$K_{12}^6$		Range measurement scaling factor
$K_{13}^6$		Range rate measurement scaling factor
$K_{14}^6$		Range rate measurement bias factor
$K_2^7$		Noise term for covariance diagonal
$R_m$		Range
$\dot{R}_m$		range rate
ID		PGNCs downlink identification word
ID <sub>1</sub>		ID for PGNCs Rendezvous and Prethrust list (077775 <sub>8</sub> )
ID <sub>2</sub>		ID for PGNCs State Vector Transfer list (077776 <sub>8</sub> )
$\beta_R$		Radar shaft angle from PGNCs downlink
$\Theta_R$		Radar trunnion angle from PGNCs downlink
$\mu_{19}$		Counter showing number of range and range rate marks taken since last filter initialization
7K1		Constant used to bias Tig for $V_G$ computation in EXT. $\Delta V$ mode

**PRELIMINARY**

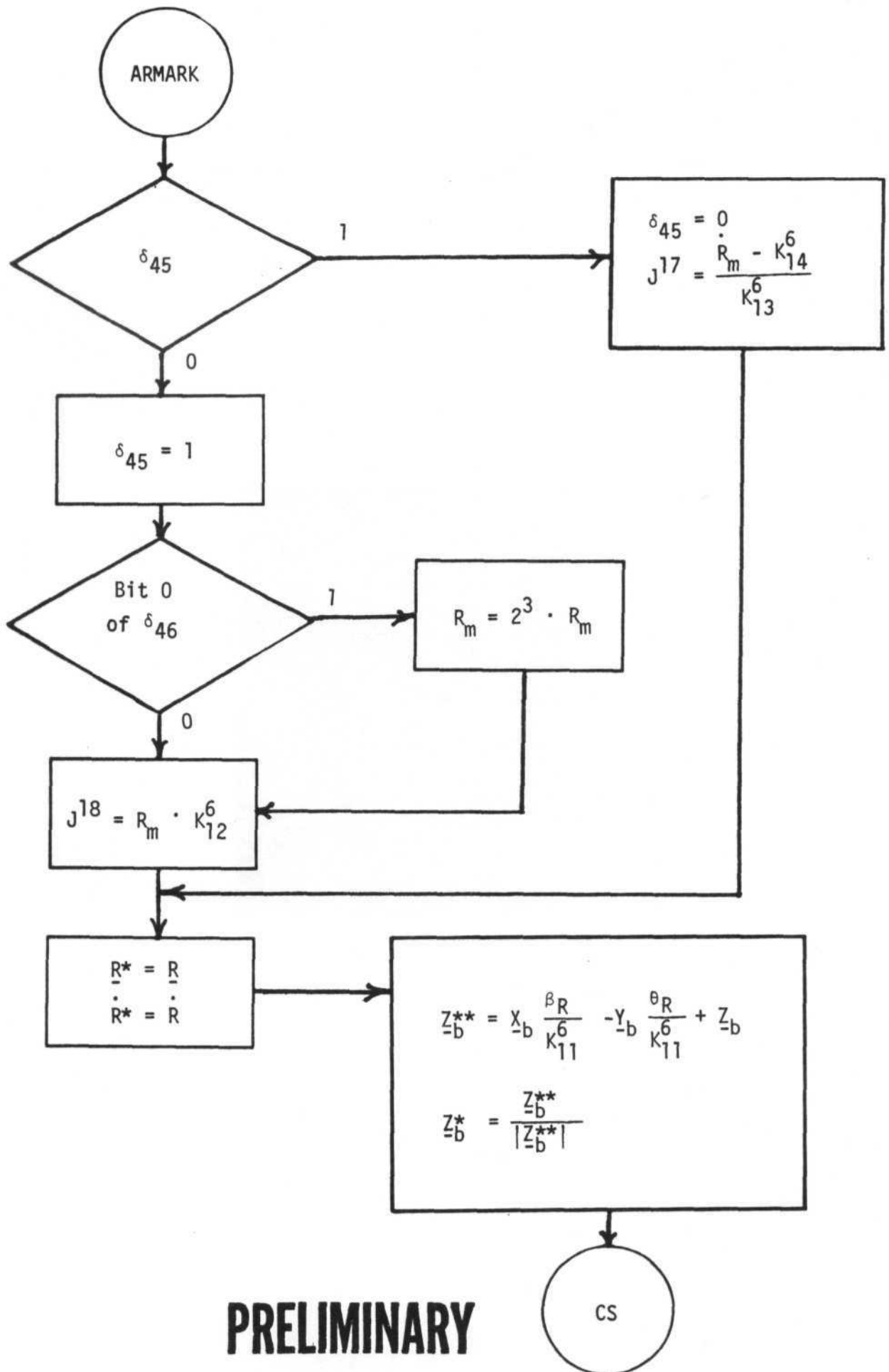


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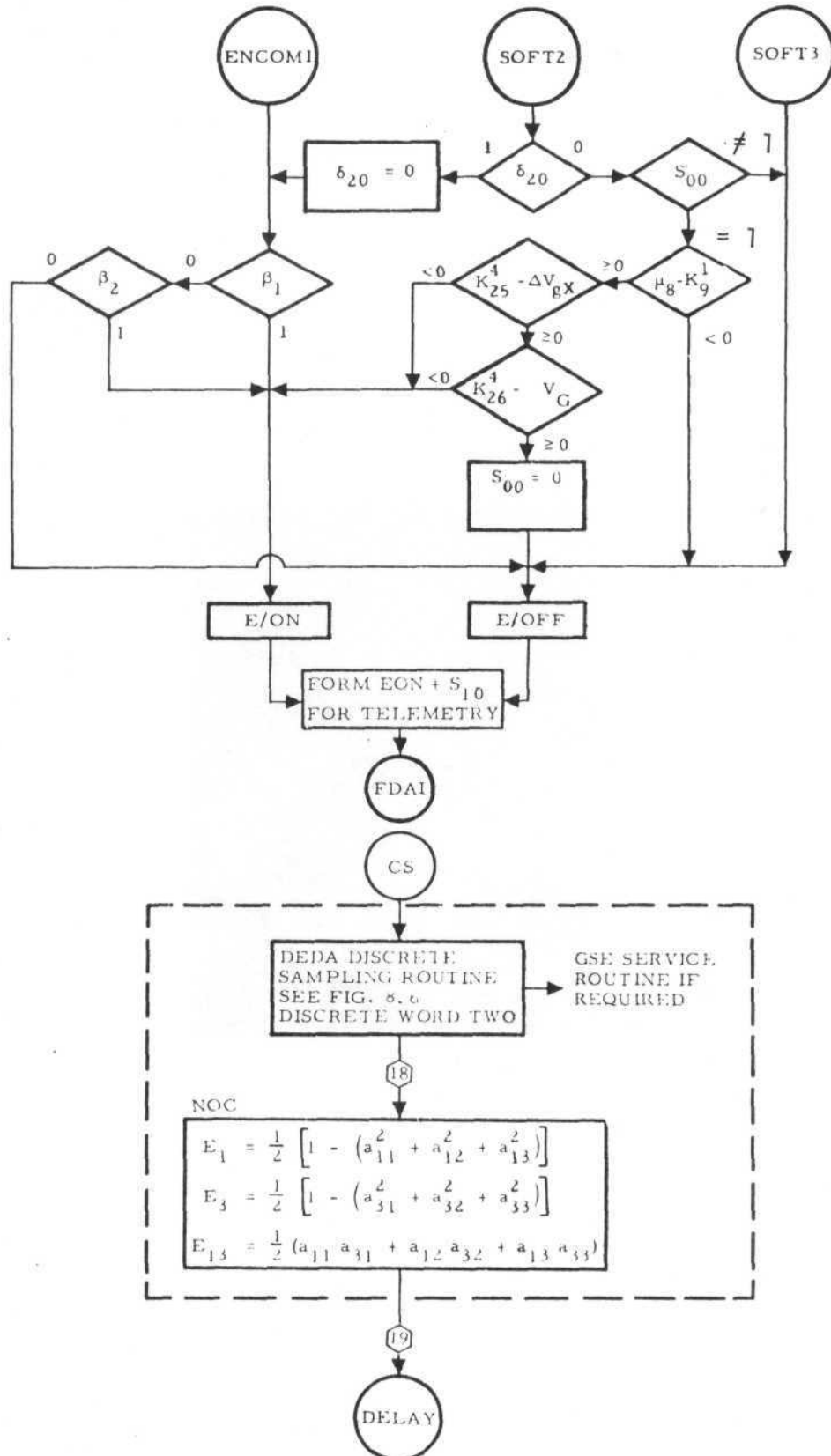


40-msec Attitude Error Computations

←5 LUNAL

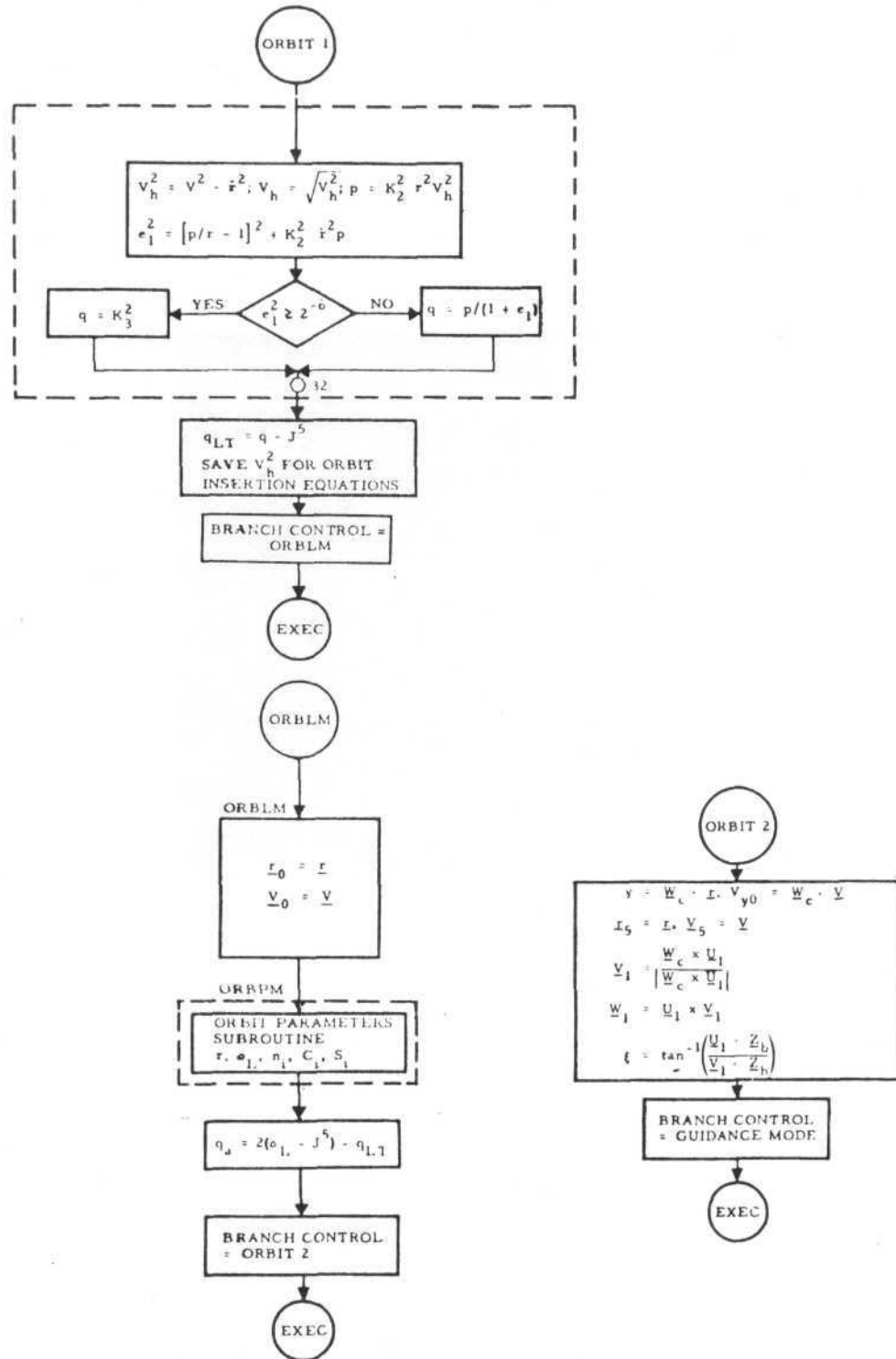


**PRELIMINARY**



Engine Discrete Logic; Direction Cosine Normality and Orthogonality Computations

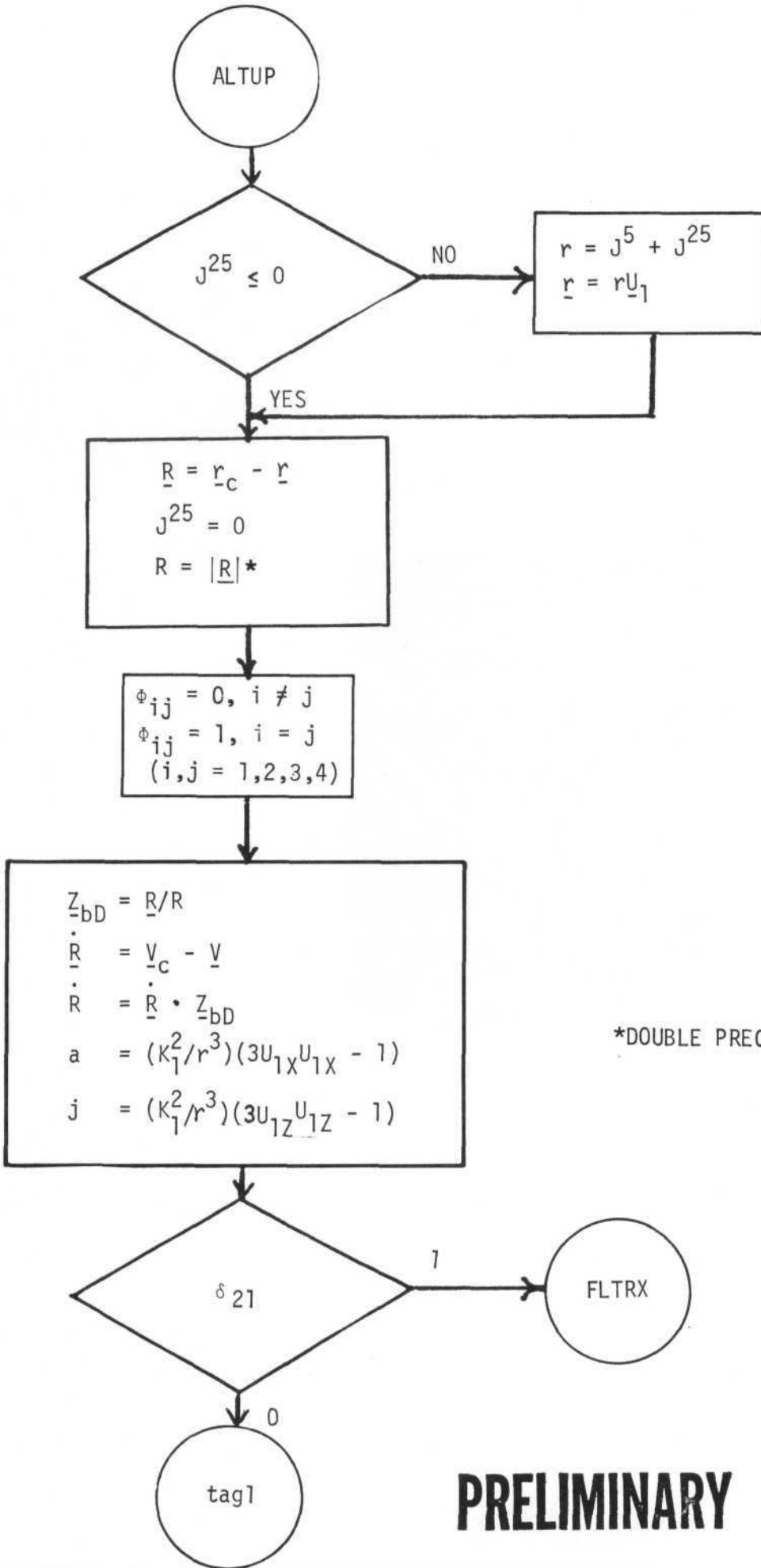
**PRELIMINARY**



LM Orbit Parameters

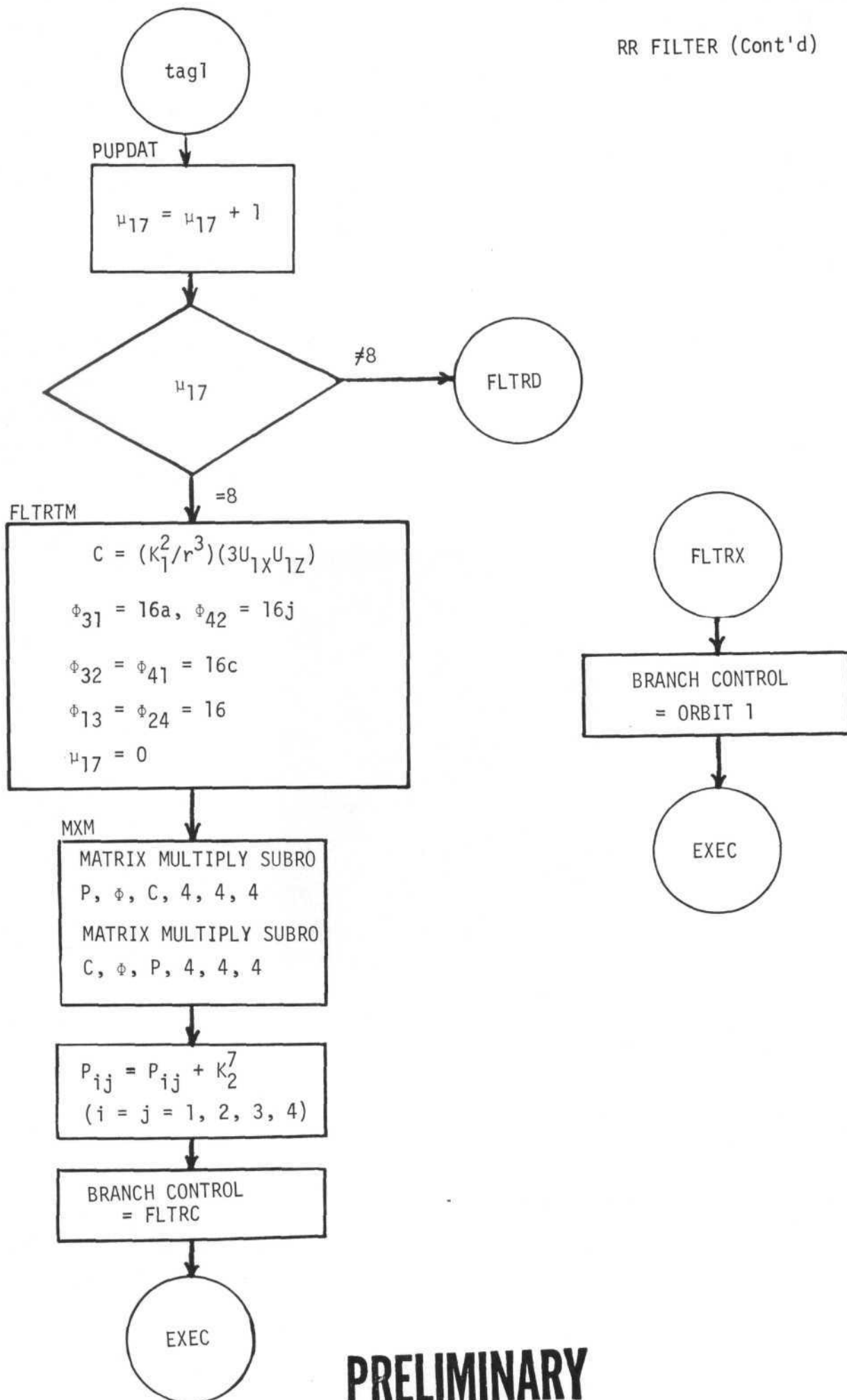
**PRELIMINARY**

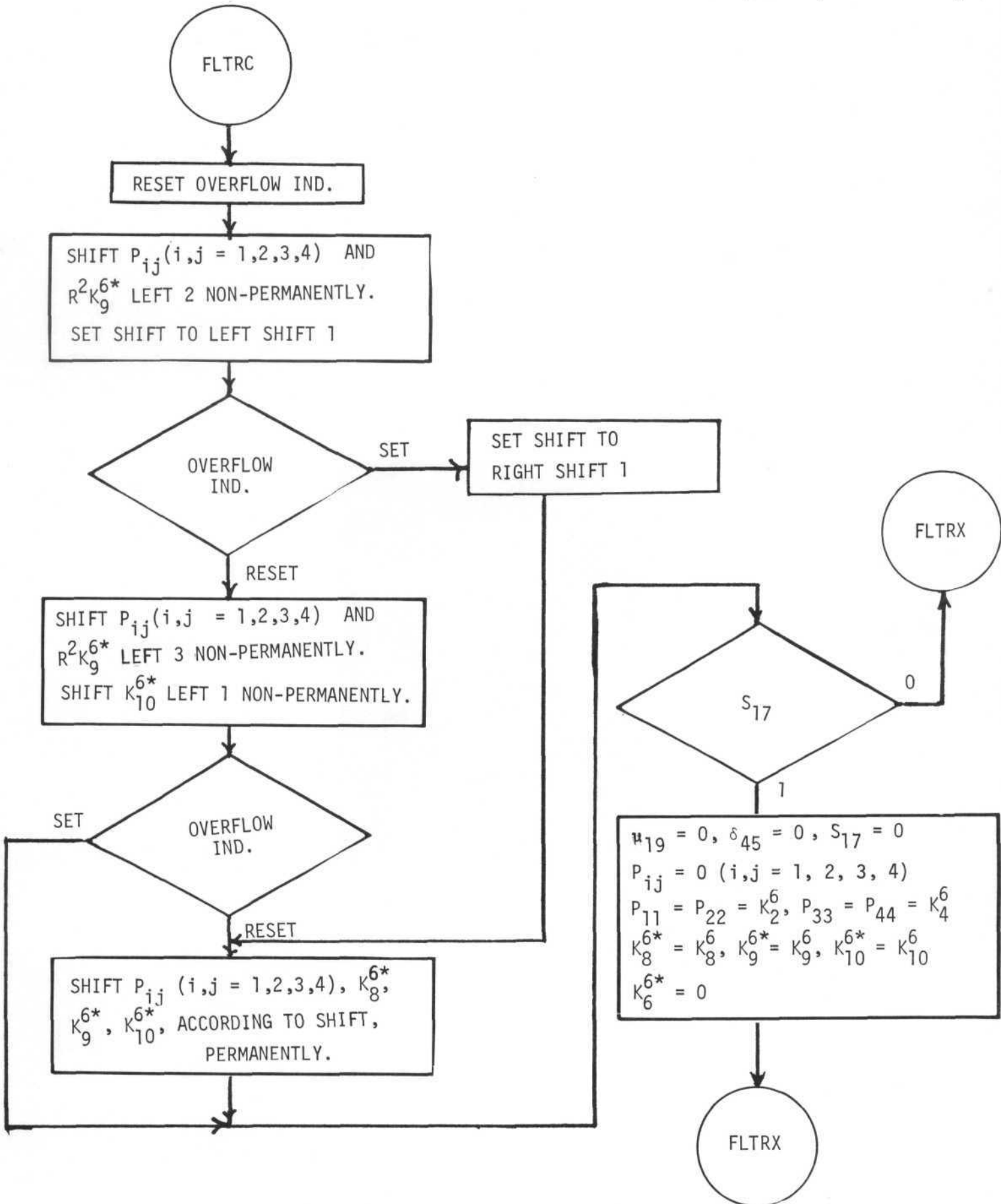




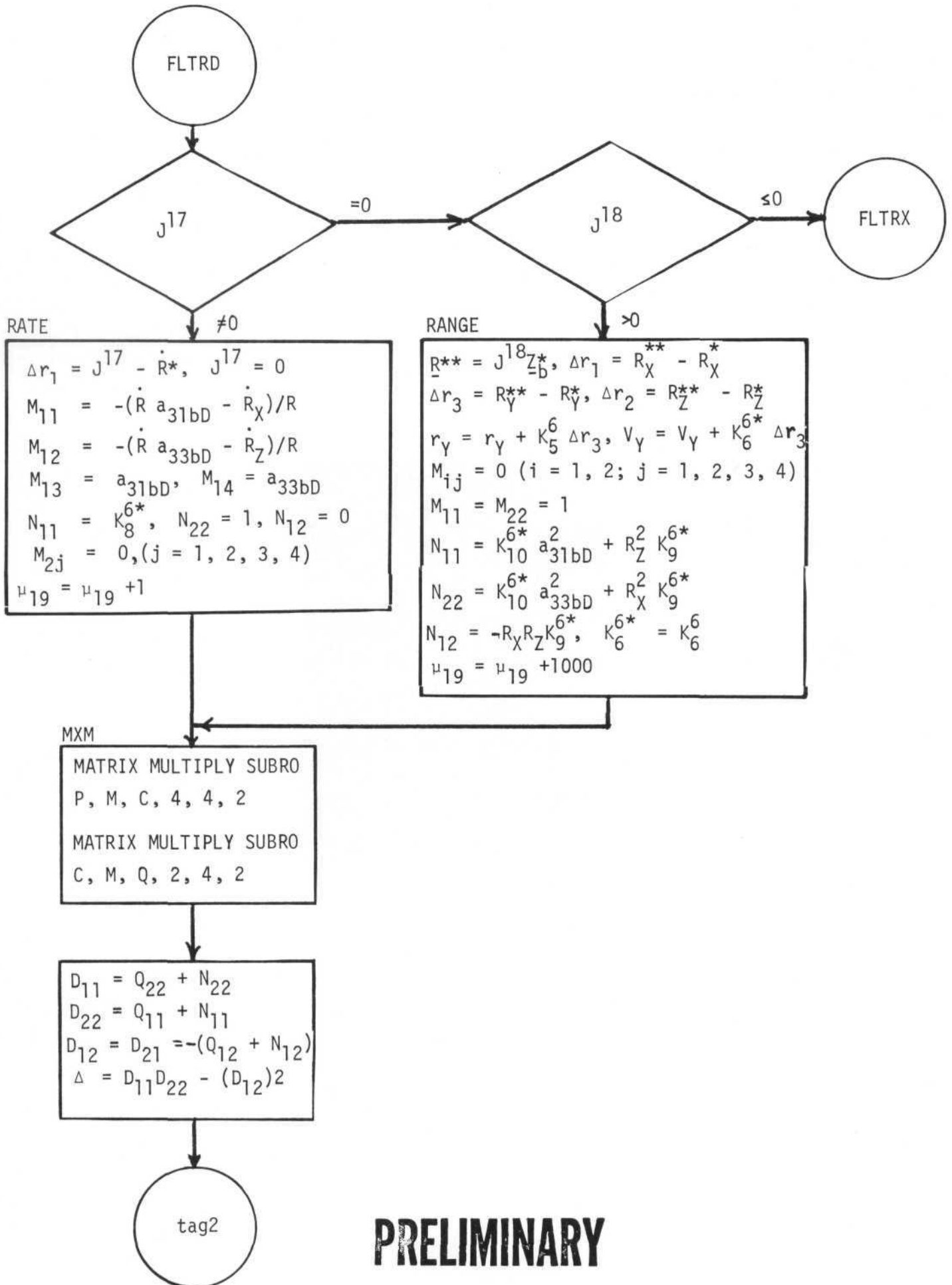
\*DOUBLE PRECISION COMPUTATION

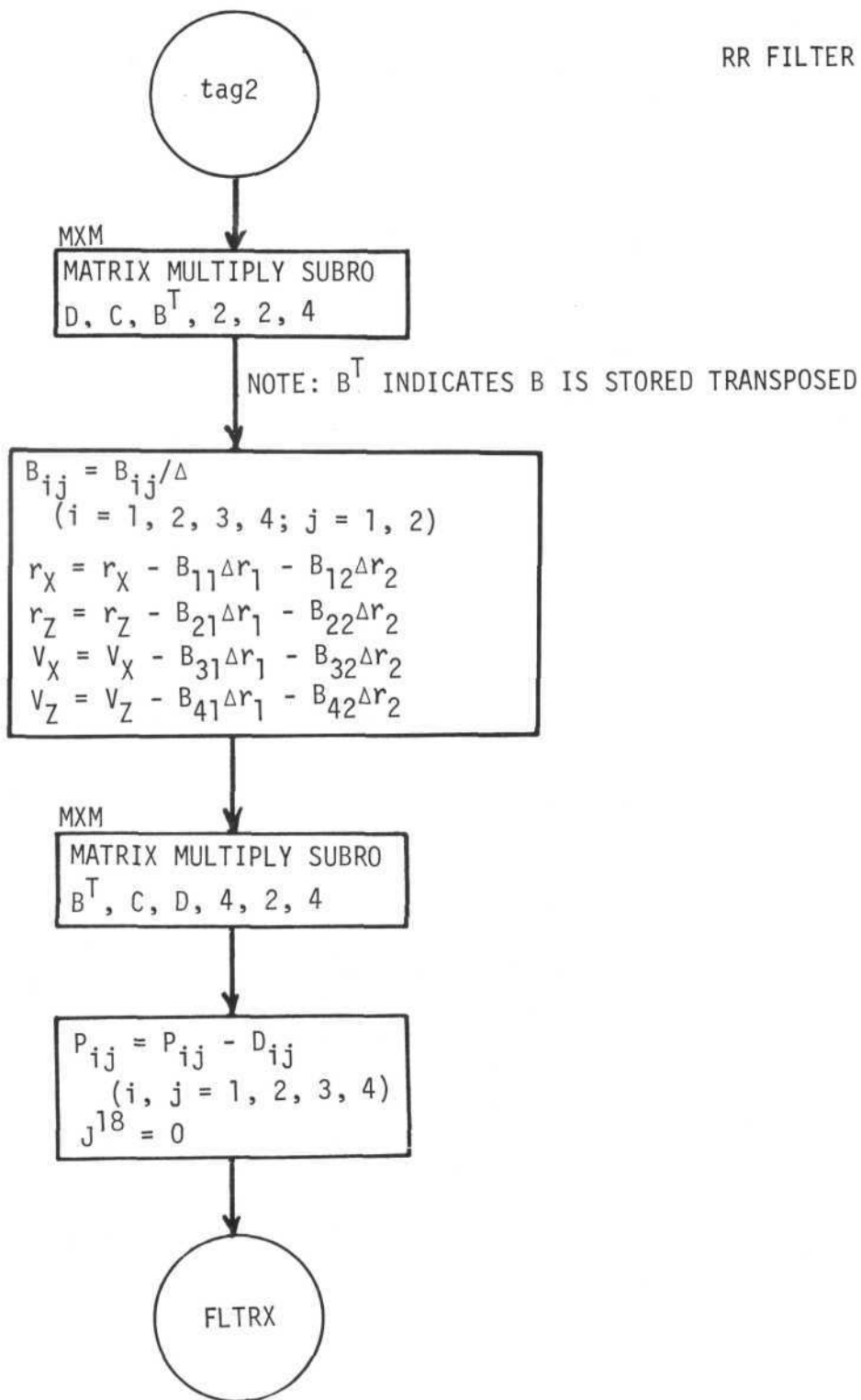
**PRELIMINARY**

**PRELIMINARY**

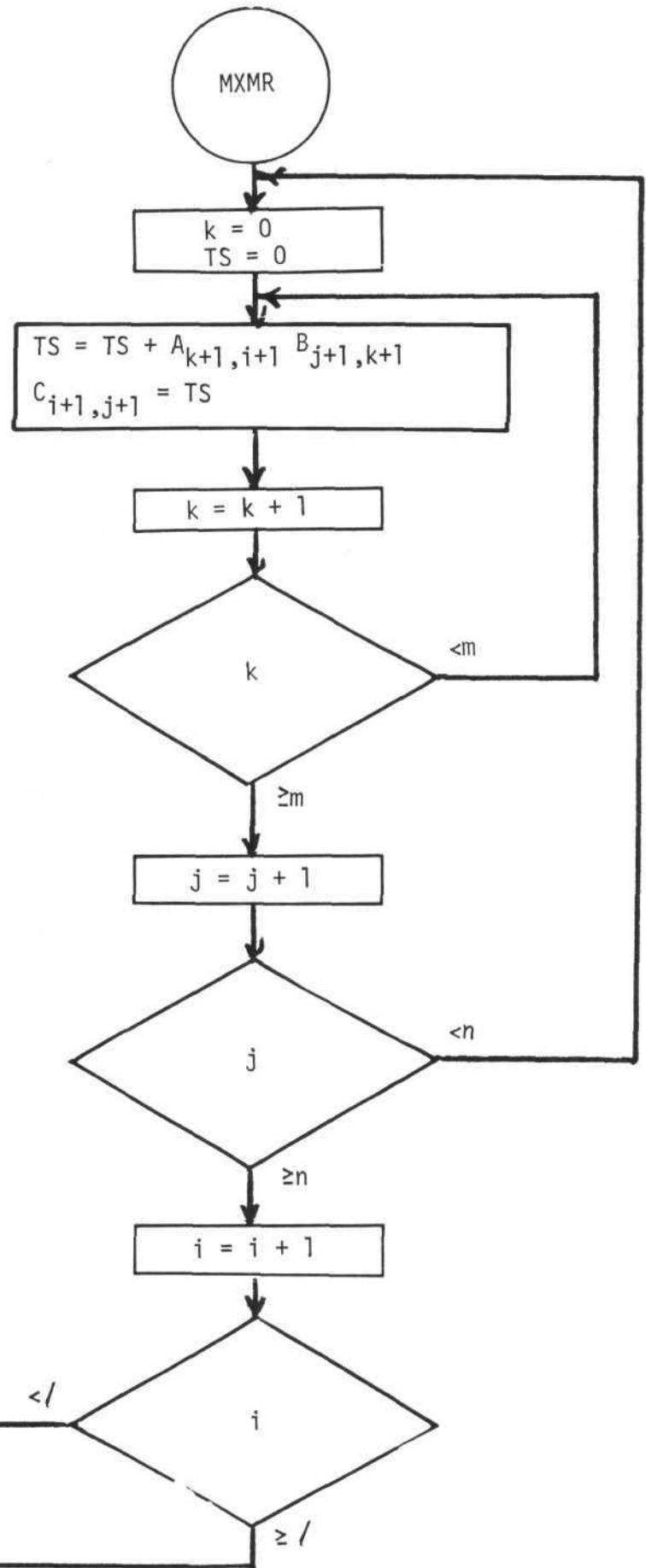
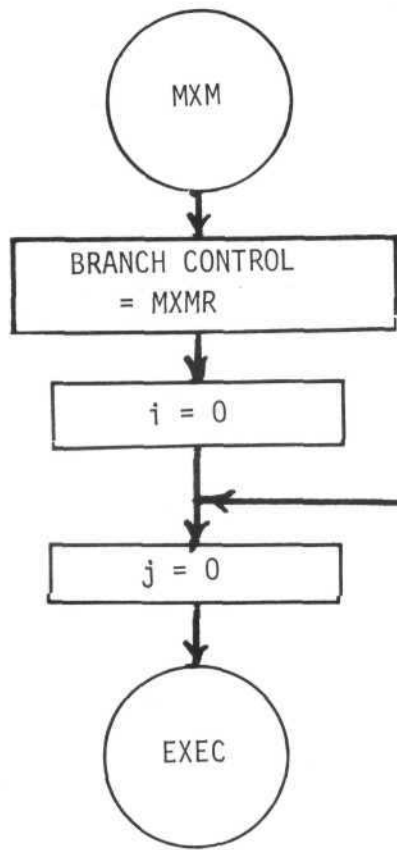


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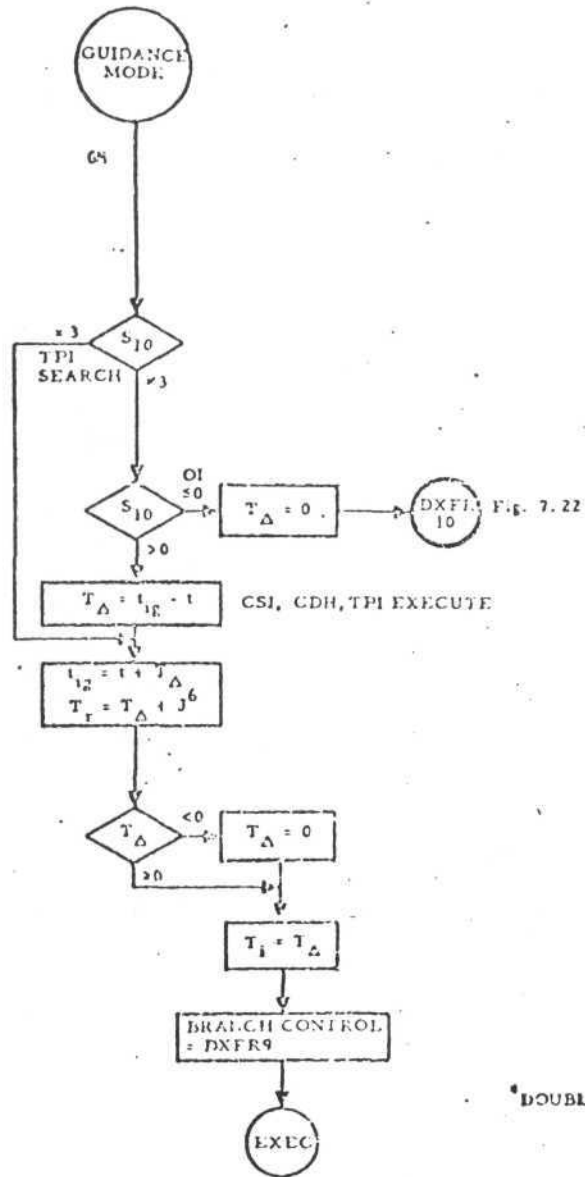
**PRELIMINARY**



CALLING SEQUENCE : A, B, C, /, m, n  
COMPUTES:

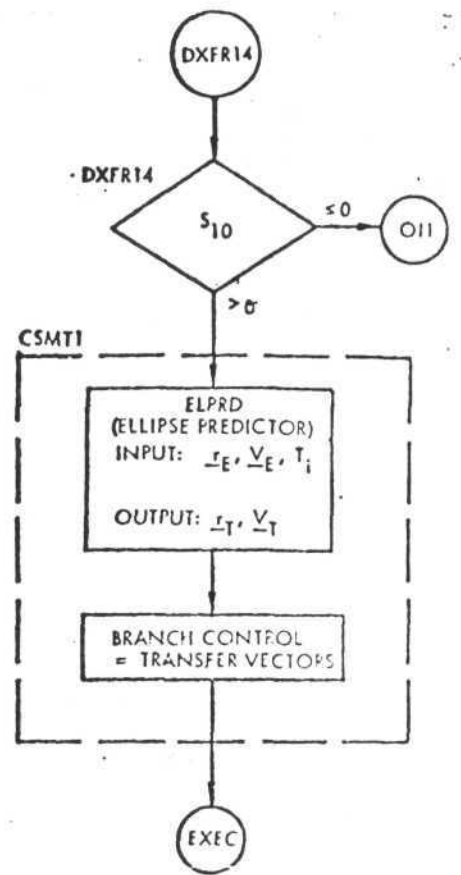
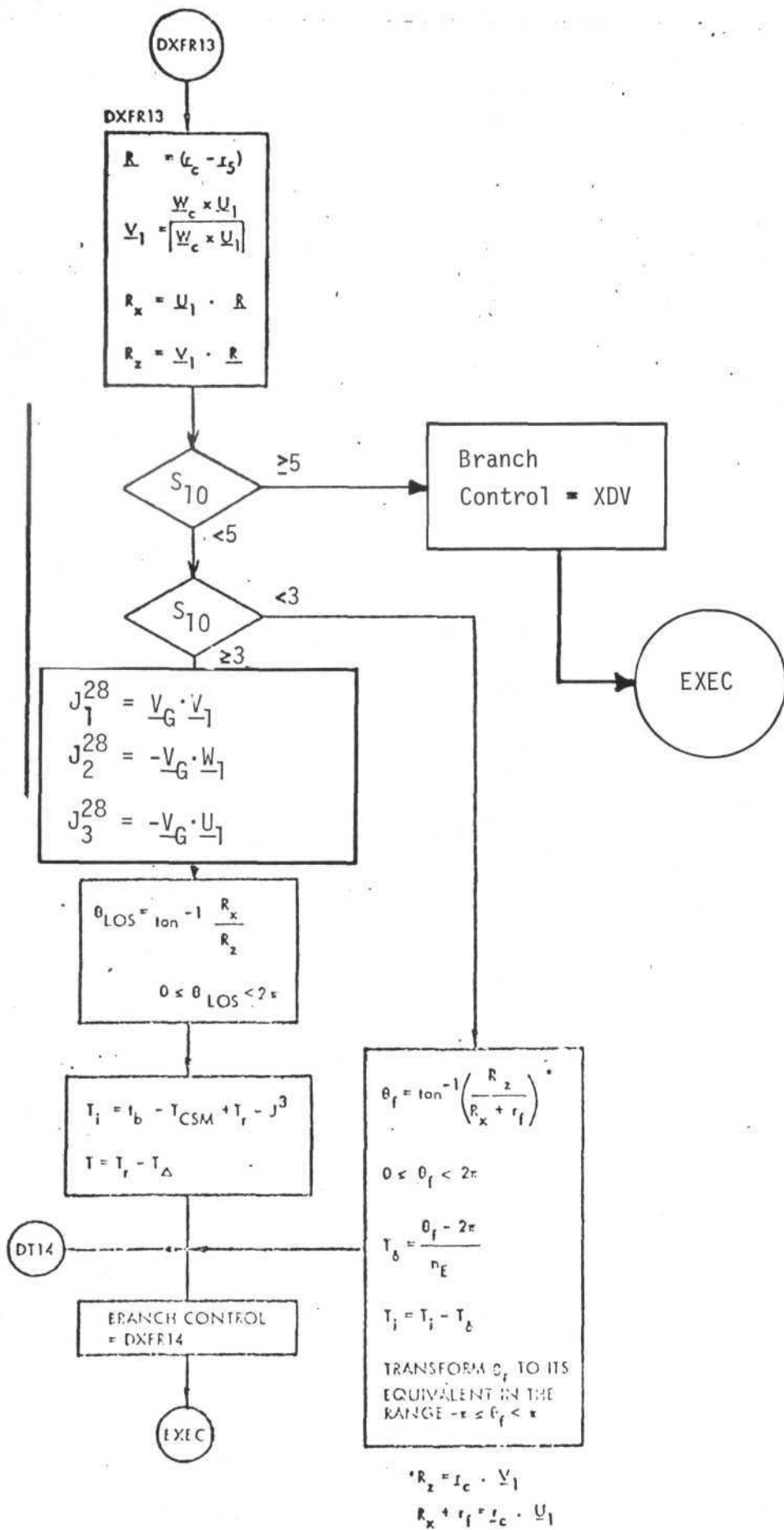
$$\begin{matrix} \leftarrow n \rightarrow \\ \uparrow \\ [C] \\ \downarrow \end{matrix} = \begin{matrix} \leftarrow / \rightarrow \\ \uparrow \\ [A] \\ \downarrow \end{matrix}^T \begin{matrix} \leftarrow m \rightarrow \\ [B] \\ \downarrow \end{matrix}^T$$

**PRELIMINARY**



Guidance Selection Logic,

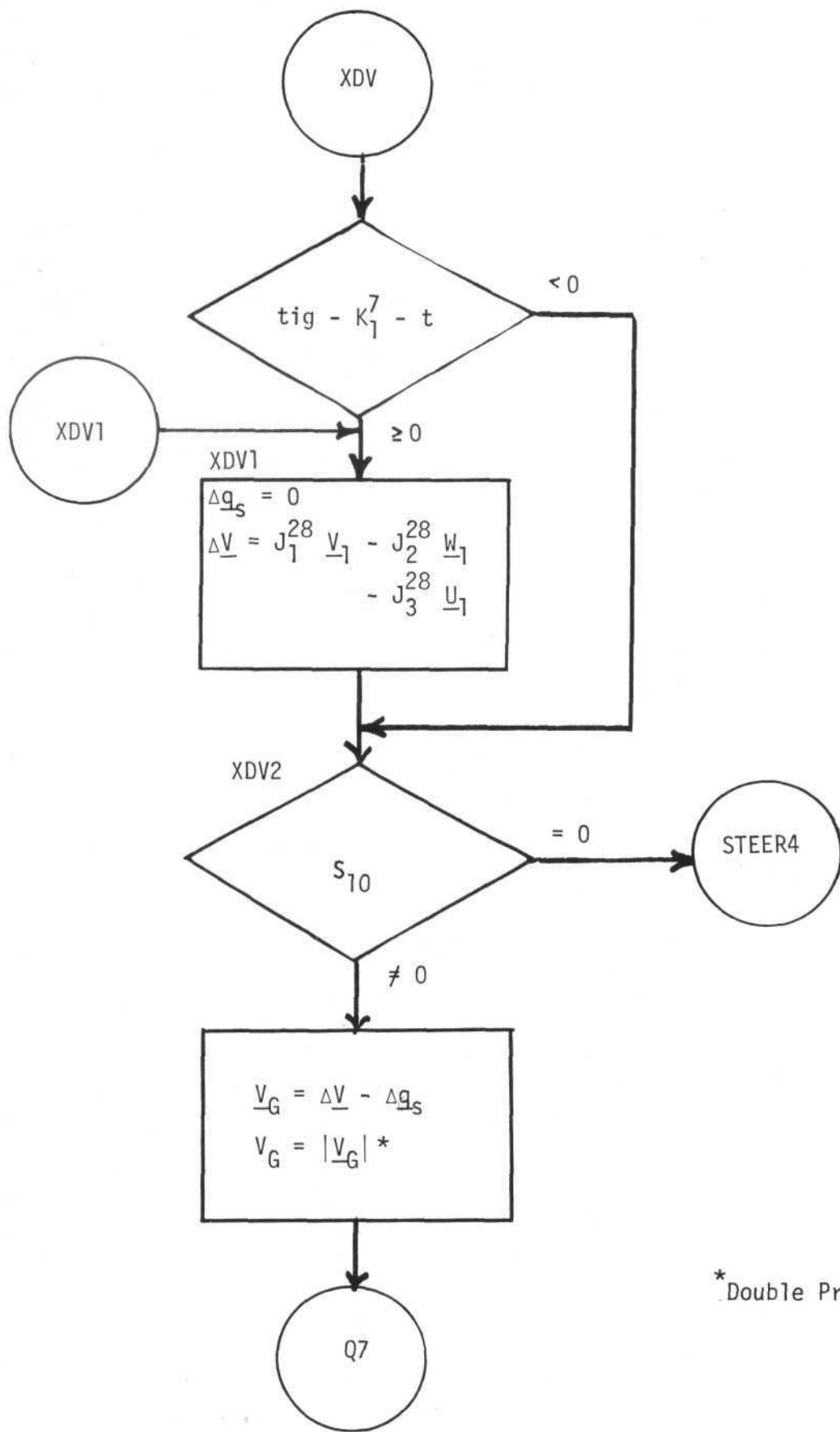
**PRELIMINARY**



**PRELIMINARY**

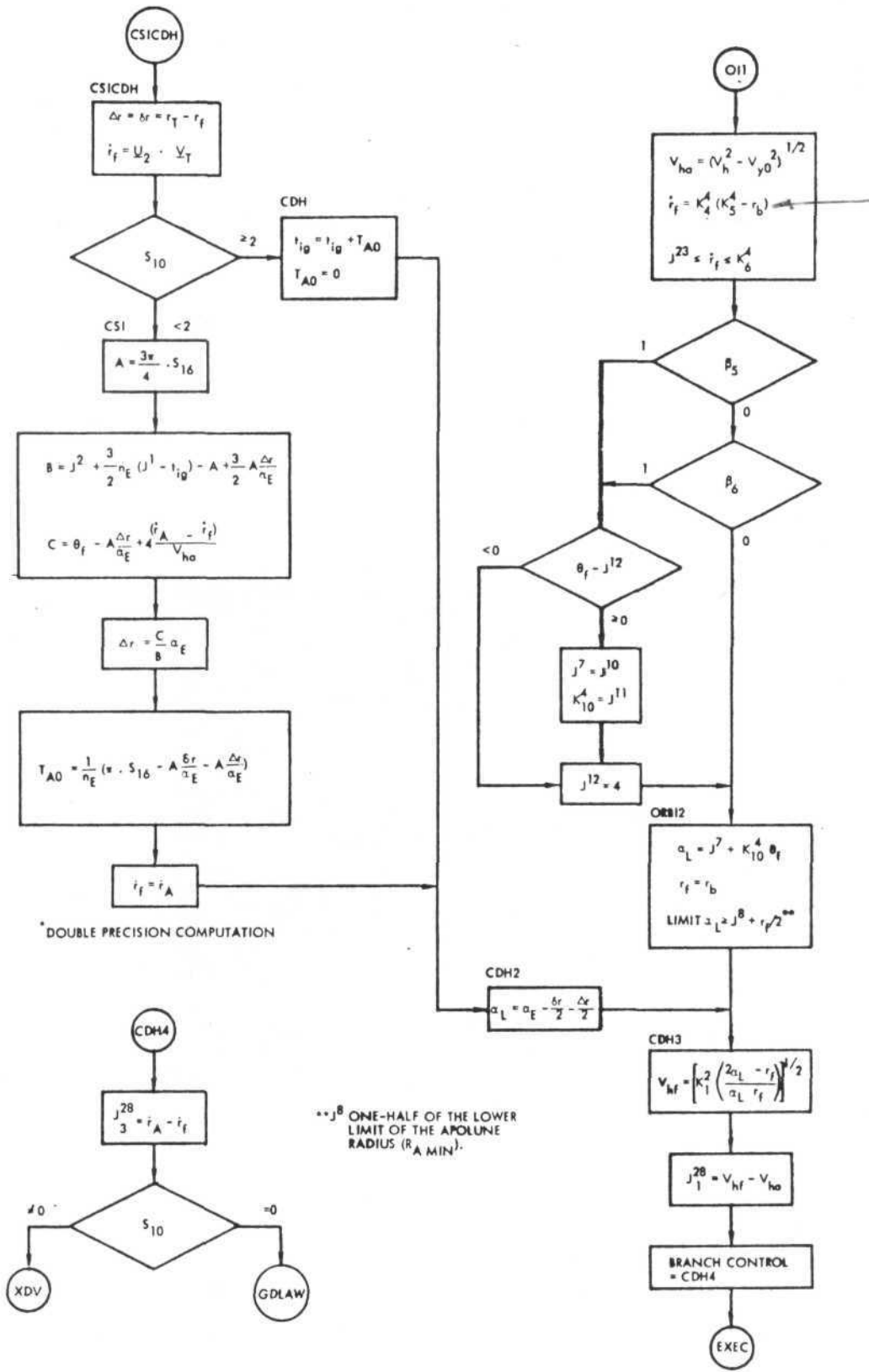
Central Angle/Line of Sight Angle Calculation/CSM Predictor /EXTERNAL  $\Delta V$  ROUTINE





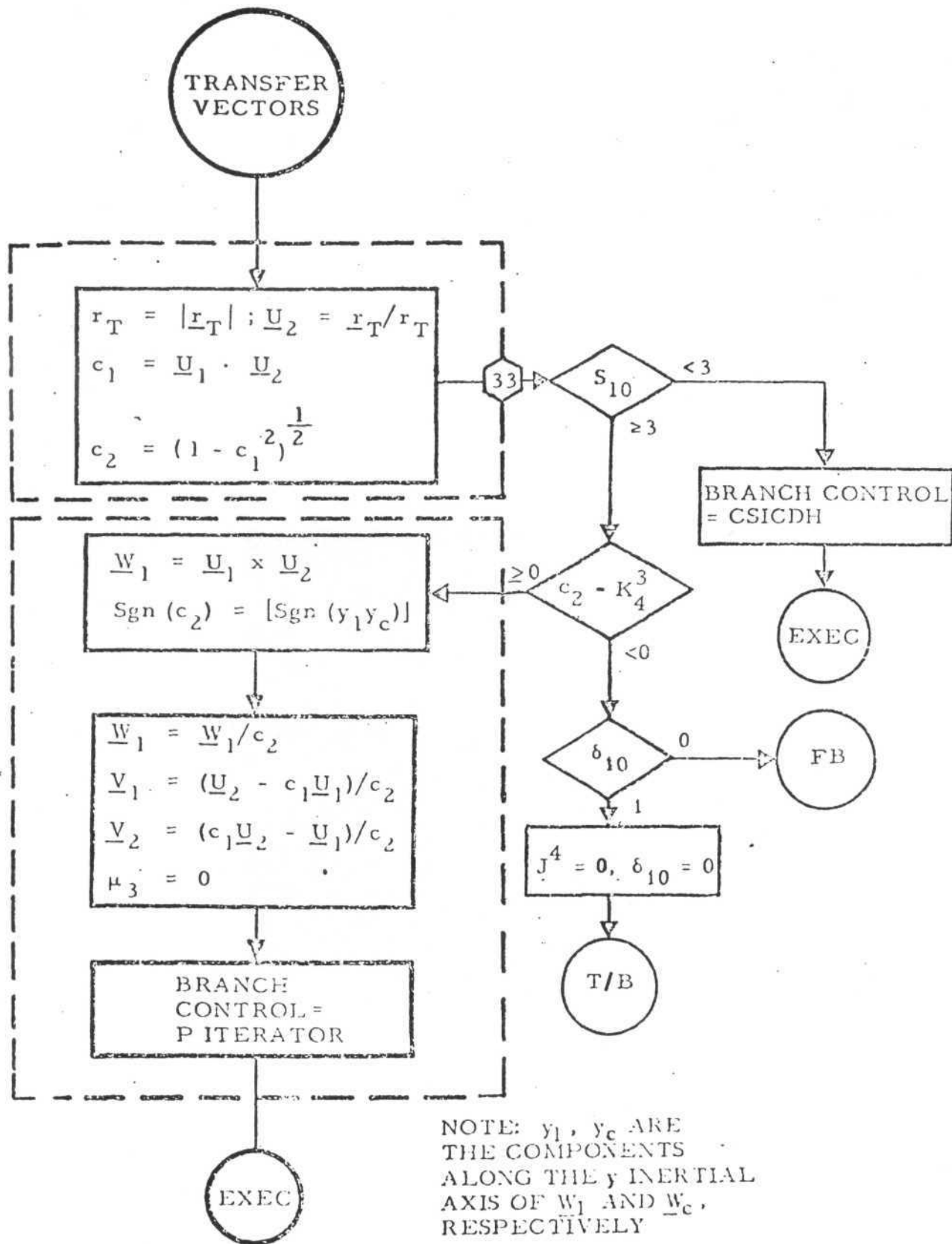
\* Double Precision Computation

**PRELIMINARY**



Computations of Vg Components for CSI, CDH, and OI

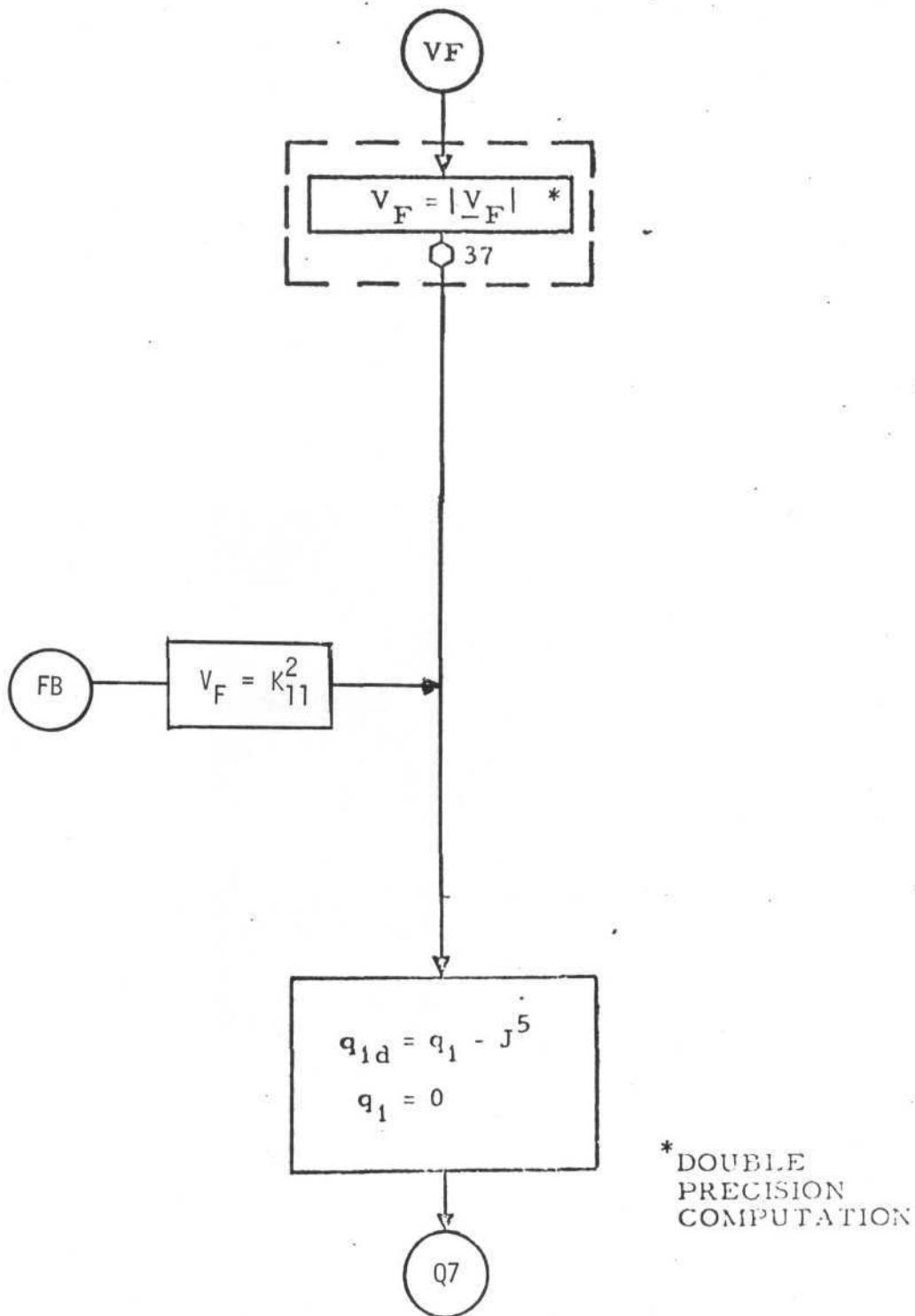
**PRELIMINARY**



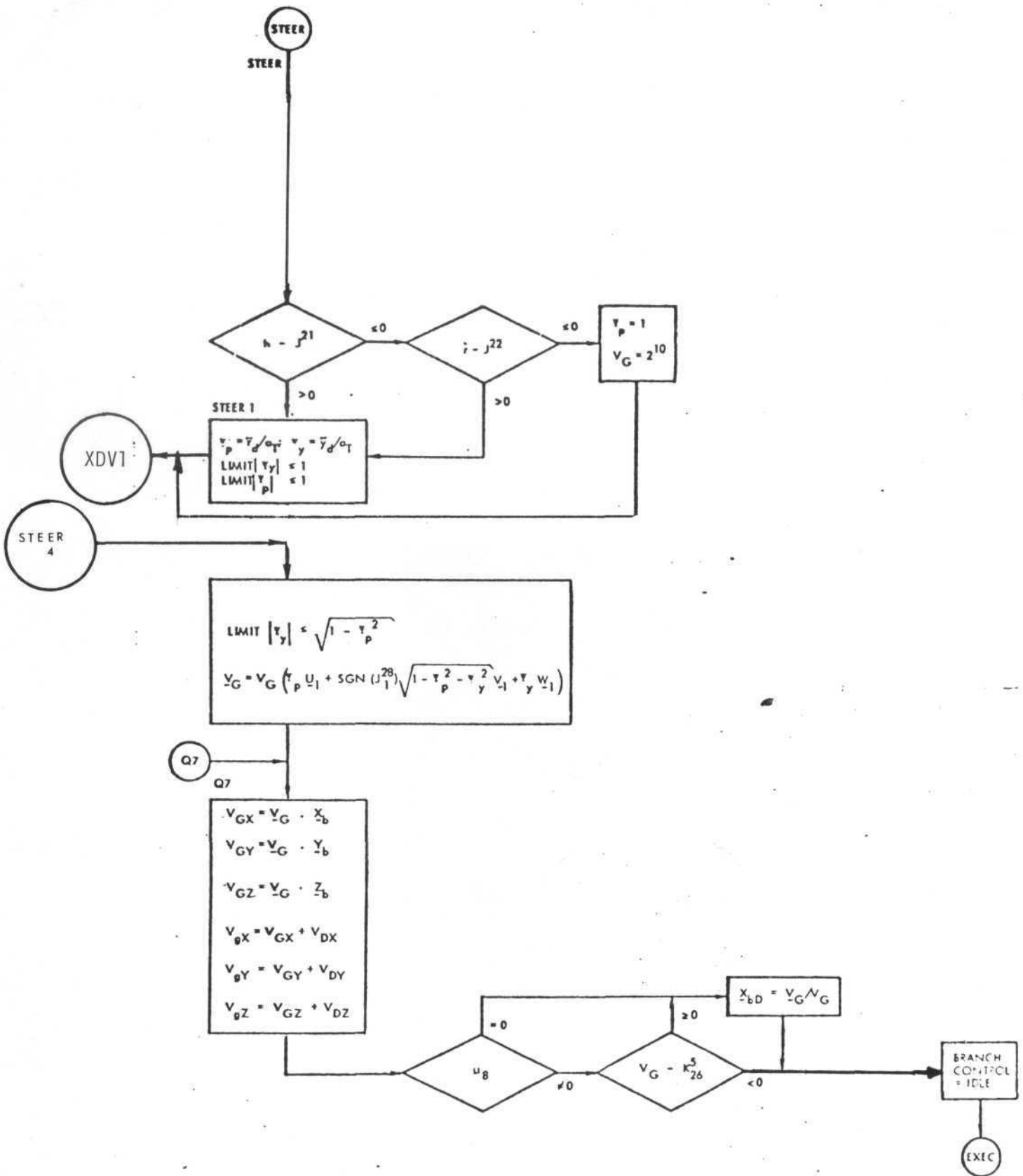
Prediction of Transfer Orbit Vectors and Central Angle Sine and Cosine

**PRELIMINARY**

# PRELIMINARY

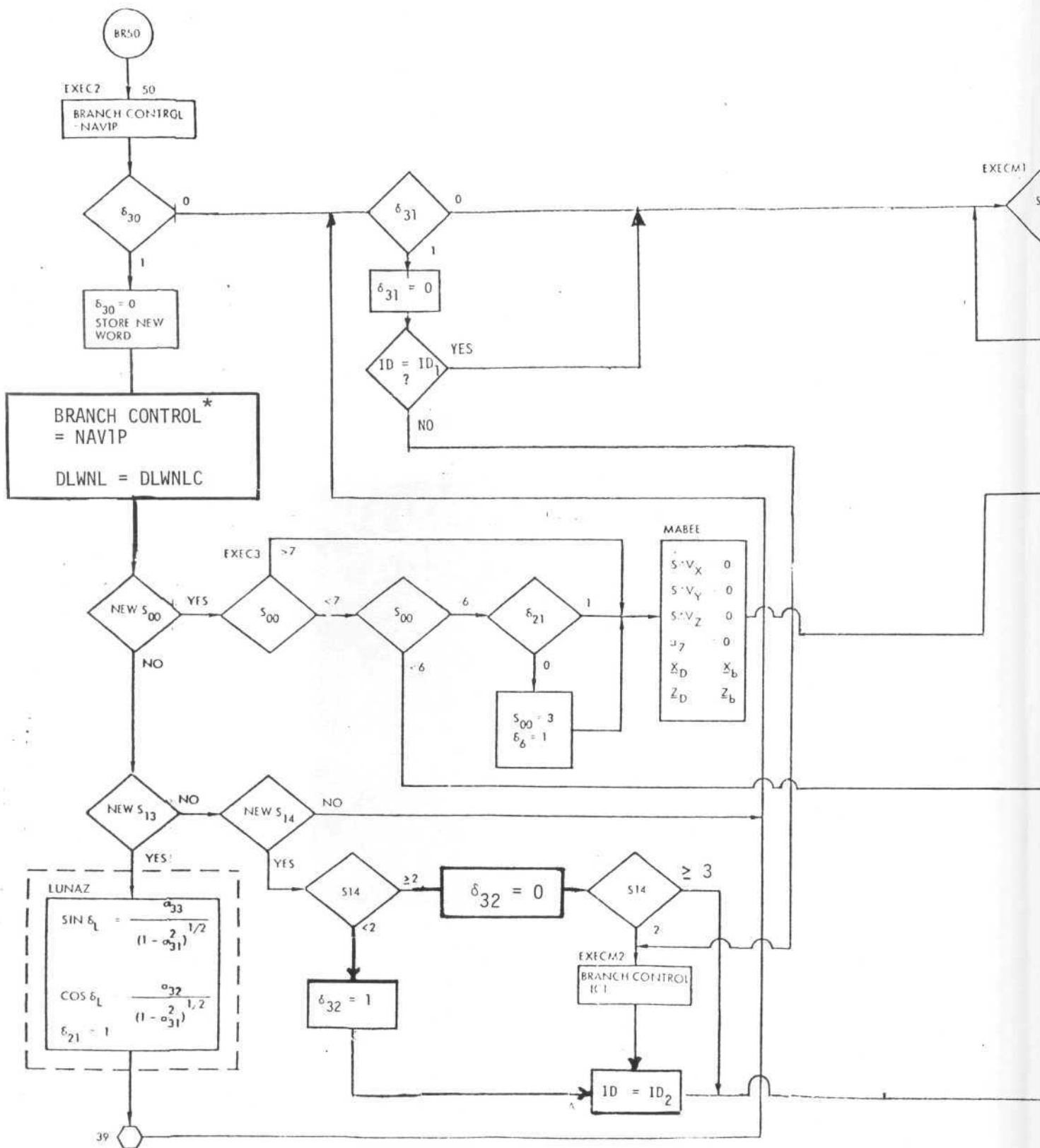


Total Velocity for TPI



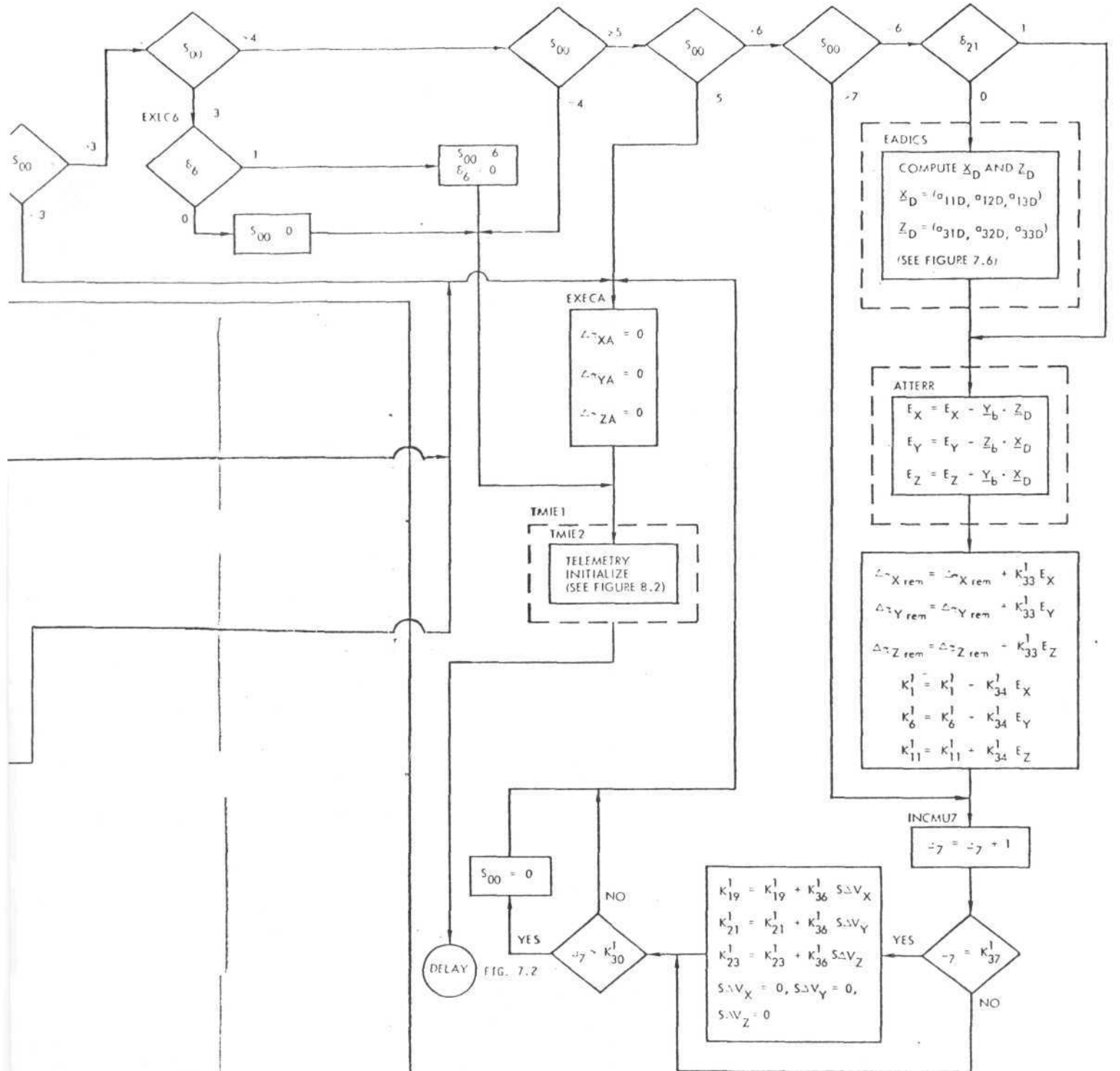
Pitch and Yaw Steering Equations and Velocity-to-be-Gained Equations

**PRELIMINARY**



\*This provides program protection against a DEDA entry into BRANCH CONTROL and Downlink stop address.

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The Executive Branch, Branch 50

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