








Traverse Closure with Co-ordinate Computation

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Line	Instruction	Display	User Instructions
M0001	LBL M		Press XEQ M. Enter X/E co-ord of first point. Press R/S. Enter Y/N co-ord of first point. Press R/S. (Enter using  CLEAR X)
M0002	360		
M0003	STO Z		
M0004	CL Σ		
M0005	INPUT X	X?	
M0006	INPUT Y	Y?	
M0007	CLx		
M0008	ENTER		
M0009	ENTER		
M0010	ENTER		
M0011	STOP	0.0000	Enter bearing of first line. Press R/S. Enter length of side. Press R/S (Enter using  SUMS n) (Enter using  SUMS Σx) (Enter using  SUMS Σy) (see stack description on next page)
N0001	LBL N		
N0002	→HR		
N0003	STOP	Bg in dec. deg.	
N0004	θ,r → y,x		
N0005	Σ+		
N0006	n		
N0007	Σx		
N0008	RCL+ Y		
N0009	Σy	No. of sides	
N0010	RCL+ X	Y co-ordinate	
N0011	STOP	X co-ordinate	
N0012	x ≥ 0?		Enter bearing of next side, or -1 to end. Press R/S. (Enter using  SUMS n) (Enter using  SUMS Σx) (Enter using  SUMS Σy) (see stack description on next page)
N0013	GTO N		
N0014	n		
N0015	Σy		
N0016	Σx		
N0017	y,x → θ,r		
N0018	x < > y		
N0019	x < 0?		
N0020	RCL+ Z		
N0021	→HMS	No. of sides	
N0022	x < > y	Bearing	Misclosure
N0023	STOP	Length	Misclosure
N0024	0		Press R/S to clear the Z register.
N0025	STO Z		
N0026	RTN		

Traverse Closure with Co-ordinate Computation**Notes**

- (1) General closure program that computes co-ordinates for each point around the traverse, as well as traverse closure.
- (2) Begin by pressing XEQ M, then enter the starting co-ordinates at the prompts. Note that the current contents of the registers are displayed, but are overwritten by what you enter. If the correct values are already in the registers and shown in X on the stack, pressing R/S accepts them without changing them or entering anything more.
- (3) After each side (azimuth and distance) has been entered and processed, the stack holds the following data:

Stack Register	Contents
T	
Z	Number of sides entered
Y	Y co-ordinate of point
X	X co-ordinate of point

- (4) After entering and processing the last side of the traverse, enter a negative value for the azimuth of the next line, e.g., -1. Press R/S. The traverse misclosure is displayed in the stack, thus:

Stack Register	Contents
T	
Z	Number of sides entered
Y	Azimuth of misclosure
X	Length of misclosure

- (5) Co-ordinates of points are displayed on the stack, but are not stored in the calculator at all. You have to write these down to record them.
- (6) Azimuths are entered and displayed in HP notation, i.e., DDD.MMSS
- (7) The misclosure components in X (or E) and Y (or N) can be displayed by recalling Σy and Σx using the SUMS menu. (Note these are 'back-to-front'.)

Theory

The traverse closure works using conventional resolving of the sides (vectors) into orthogonal components. The co-ordinates of the starting point are stored and added to the accumulated ΔX and ΔY values in the statistical registers after each side is computed. The misclosure is converted to an azimuth and distance for the final display. Enter a negative azimuth to trigger the end of the program and the misclosure display.

Traverse Closure with Co-ordinate Computation

Azimuths in HP notation are used. An arbitrary azimuth or whole circle bearings are satisfactory. Plane surveying assumptions apply. The program uses no error checking on entered data.

Sample Computation

Azimuth	Distance	X/E Co-ordinate	Y/N Co-ordinate
		1000.000	5000.000
6° 53' 10"	72.00	1008.633	5071.481
112° 37' 20"	102.23	1102.997	5032.158
185° 39' 50"	29.04	1100.131	5003.259
181° 30' 00"	27.88	1099.401	4975.389
283° 54' 30"	102.38	1000.023	4999.998
	Misclosure:	+ 0.023	-0.002

Results

DE = 0.023 (in SUMS Σy)

DN = -0.002 (in SUMS Σx)

Misclosure Length = 0.023

Misclosure Azimuth = 95° 24' 15"

Storage Registers Used

- X** X co-ordinate of first point
- Y** Y co-ordinate of first point
- Z** Set to 360, but set to 0 at the end of the program.

Statistical Registers: Σx = Current ΔY or ΔN from starting point
 Σy = Current ΔX or ΔE from starting point
 n = Number of sides entered from start

Labels Used

Label M Length = 45 Checksum = 495F

Label N Length = 90 Checksum = 652A

Use the length (LN=) and Checksum (CK=) values to check if program was entered correctly. Use the sample computation to check proper operation after entry.