Rect Sharma
106030
F2.

EXPERIMENT-05.

PAGE NO :
DATE : / /

COMPUTATION OF REDUCED LEVEL USING AUTO LEVEL

Reduced Levels of Collimation plane Method.

LEVEL PAGE.

Staff Station	B.S	IS	FS	HI	RL	Remarks.
BM	0.700			100.700	100.00	B.M
1.		1.500			99.200	
2.		2.000			98.700	
3.	2.200		1.800	101.100	98.900	C.P.1
4.	1.000		1.800	100.300	99.300	C.P.2.
5.			2.200		98.100	

Step 1: HI is calculated by adding BS reading to RL of BM.
100.00 + 0.700 = 100.700 m.

Step 2: RL of point 1 = 100.700 - 1.500
= 99.200 m [HI - IS reading of point 1]

Step 3: RL of point 2 : 100.700 - 2.00
= 98.700 [HI - IS reading of point 2]

Step 4: RL of point 3 = 100.700 - 1.800 [HI - FS reading of point 3]
= 98.900

Step 5: change point, New HI = 98.900 + 2.200
= 101.100 m.
[RL of point 3 + BS reading at point 3]

Step 6: RL of point 4 = 101.100 - 1.800
= 99.300 m [New HI - FS reading at point 4]

PAGE NO.:
DATE: / /

Step 7: Change point, New H.I = 99.300 + 1.000
= 100.300m
[RL of point 4 - B.S reading at point 4]

Step 8: RL of point 5 = 100.300 - 2.200 [New HI - FS reading at point 5]
= 98.100m - (last reading)

Step 9: Arithmetic Check:
The difference between the sum of backsights and the sum of foresights should be equal to the difference between the last and first RL. Thus,

$$\Sigma BS - \Sigma FS = \text{Last RL} - \text{first RL}.$$

$$3.900 - 5.800 = 98.100 - 100.00$$

$$-1.900 = -1.900.$$

The method affords a check for the HI and RL of change point but not the intermediate points.

Reduced Levels by Rise and Fall Method:

LEVEL PAGE.

Staff station	BS.	IS.	FS	Rise (+)	Fall (-)	R.L	Remark.
BM	0.700					100.000	
						B.M.	
1.		1.500			0.800	99.200	
2.		2.000			0.500	98.700	
3.	2.200		1.800	0.200		98.900	
						C.P.1	
4.	1.000		1.800	0.400		99.300	
						CP-2	
5.			2.200		1.200	98.100	
	ΣBS = 3.900		ΣFS = 5.800	Σ Rise = 0.600	Σ fall = 2.500		

PAGE NO :
DATE : / /

Calculations:

The first reading on BM is 0.700 of RL 100.000
The next reading is 1.500 m on point 1. ~~Hence~~. Here the staff reading shows increase in reading that means there is depression at point 1 as compared to the BM point.
(as staff readings increase in upper direction)

Therefore it is a fall and the amount of fall is 0.700 - 1.500 = -0.800m which is entered in fall column.
Substracting 0.800 from 100.0000 = 99.200 m.
∴ RL of point 1 is 99.200m.

Arithmetic checks:
$\Sigma BS - \Sigma FS = \Sigma Rise - \Sigma Fall = Last\ RL - first\ RL$.
For the rise and fall method problem:

$\Sigma BS = 3.900$ $\Sigma FS = 5.800$
$\Sigma Rise = 0.600$ $\Sigma fall = 2.500$
$Last\ RL = 98.100$ $first\ RL = 100.000$
} = 1.900m.

Hence, fulfilling all the checks!