國立交通大學 102 學年度第 2 學期

博士班資格考筆試考試試題

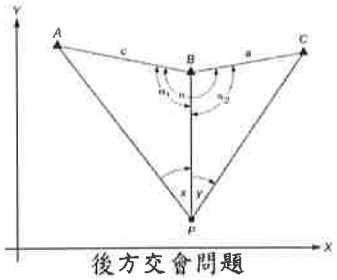
土木工程學系 測量組(戊)　科目：**基礎科目(測量學、測量平差)**　選考學生數：1　考試時間：120min

1. **In the least-squares solution of the Gauss Markoff Model, the normal matrix can be singular. In this case, the resulting adjustment system in rank defect. (a) what causes the singularity? (2) show two examples of adjustment with rank deficiency and show the numbers of rank defects in your examples. (20%)**

2. **Compare the principles and accuracies of relative positioning and precise point positioning (PPP) in GPS. (15%)**

3. **The sides of a triangle ABC were observed by an EDM instrument having specified error of ±(2mm+3ppm). The observed length (in m) of the sides AB, BC and CA were 1234.00, 1345.00 and 1572.46, respectively.**
   (a) Calculate the area of triangle ABC (5%)
   (b) Calculate the standard deviation of the area of triangle ABC (ignore the miscentering errors of instrument and target) (10%)

4. **In a problem of three-point resection, angle x and y were measured by a Theodolite. The coordinates of control points A, B, and C were (X_A, Y_A), (X_B, Y_B), (X_C, Y_C).**
   (a) Please provide detail equations to determine the coordinates of P (10%)
   (b) What is danger circle in three-point resection? How to avoid the danger circle? (5%)



後方交會問題

5. The following data apply to a closed link traverse. Please adjust them and fill-in the following table (Total mark: 35%)

Remarks: (1) The details of calculation should be provided. (2) The units of the answers should be given.

Station	Measured angle(angle to the right)	Azimuth	Azimuth correction	Preliminary Azimuth	Measured length(m)	Unbalanced departure(m)	Unbalanced latitude(m)	Balanced departure(m)	Balanced latitude(m)	X(m)	Y(m)	Adjusted length(m)	Adjusted azimuth
(Marks)				(3%)				(3%)	(3%)	(5%)	(5%)	(3%)	(3%)
$AzMk_1$	X	X	X	X	X	X	X	X	X	X	X	X	X
		35°32'	0	35°32'	X	X	X	X	X			X	35°32'
A	260°39'				200.00					1012.64	1011.20		
B	230°55'				200.00								
C	83°10'				100.00								
D	122°30'				X	X	X	X	X	1331.12	762.40	X	12°34'
$AzMk_2$	X	12°34'		12°34'						X	X		
		X	X	X	X	X	X	X	X			X	X
					Sum:	Sum:	Sum:						

Angular misclosure(2%)=

Misclosure in departure(2%)=

Misclosure in latitude(2%)

Linear misclosure (2%)=

Relative precision (2%)=