

國立陽明交通大學 111 學年度第 1 學期

博士班資格考筆試考試試題

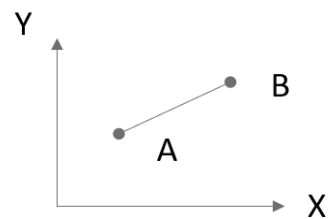
土木工程學系 測量組

科目：測量學及測量平差

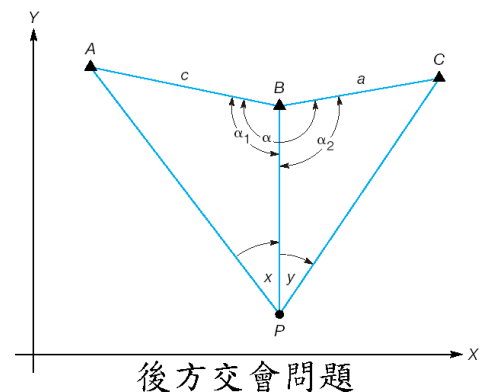
選考學生數：1

考試時間：120 min

1. Explain the theory and practice of Pope's tau-test for detecting outliers in data. Please use an example to explain the test. (15%)
2. Precision leveling is often used to adjust differential heights observed in a leveling network. Observed differential heights can be adjusted using the least-squares method for (1) the Gauss-Markoff model and (2) for the model with condition equations. Please explain that the least-squares solutions for the two models will result in the same adjusted differential heights. (20%)
3. This figure shows the $A(X_A, Y_A)$ and $B(X_B, Y_B)$ points, whose standard deviations are $(\sigma_{X_A}, \sigma_{Y_A})$ and $(\sigma_{X_B}, \sigma_{Y_B})$, respectively. Provided that the observations are correlated, please explain the accuracy of the distance \overline{AB} and the accuracy of the azimuth from A to B with proper parameter representation. (15%)
4. Describe the meaning and work of the following terms:
 - (a) Interior reliability in adjustment (5%)
 - (b) Exterior reliability in adjustment (5%)
 - (c) Interior accuracy in quality assessment (5%)
 - (d) Exterior accuracy in quality assessment (5%)
5. How to convert (E, N) coordinates from TWD67 (EPSG 3828) to TWD97 (EPSG 3826)? Please provide detailed information about this procedure. (15%)



6. The figure shows a problem of three-point resection. The angles x and y were measured as $48^{\circ}53'12''$ and $41^{\circ}20'35''$, respectively. The coordinates of points A, B, and C were $(X_A=0\text{m}, Y_A=0\text{m})$, $(X_B=7821.74\text{m}, Y_B=695.47\text{m})$, $(X_C=14628.84\text{m}, Y_C=3058.74\text{m})$, respectively. Please calculate the coordinates of point P. (15%)



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博士班資格考筆試考試試題

土木工程學系 測量組

科目：衛星大地測量及物理大地

選考學生數：1

考試時間：120 min

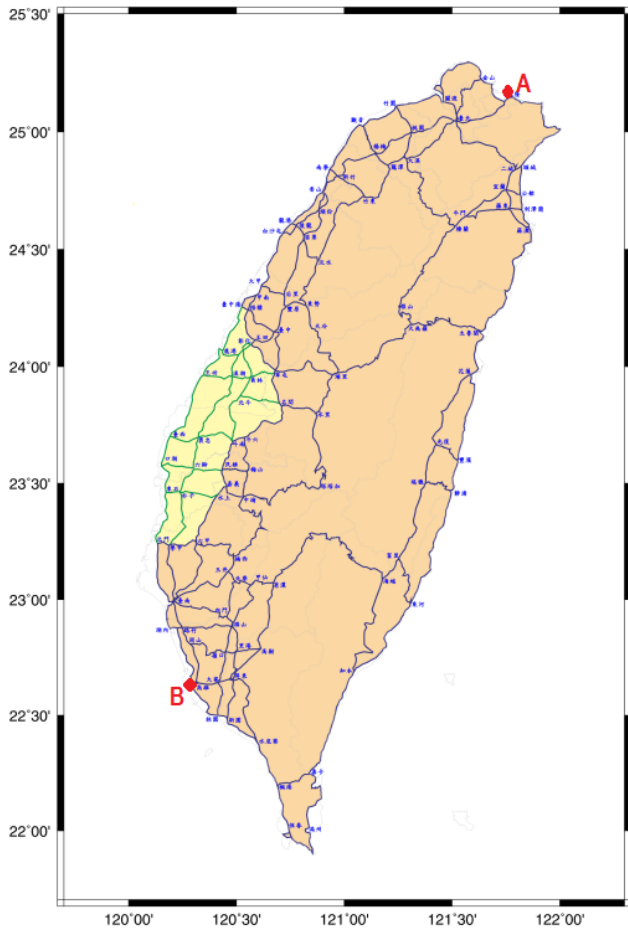
共 2 頁，第 1 頁

Satellite Geodesy (open book)

1. Explain atomic time and sidereal time. (30%)
2. Explain the two-body motion of satellite orbits. (20%)
3. Explain how satellite altimeter data are used to detect
 - (a) Sea level changes. (15%)
 - (b) Glacier elevation changes. (15%)
4. Answer the following questions about InSAR.
 - (a) What is the principle of InSAR? (10%)
 - (b) how InSAR is used to determine post-seismic ground deformation. (10%)

物理大地測量(open book)

1. 請申論為何在利用重力異常(gravity anomaly)計算大地起伏(geoidal undulation)時，需要針對地形進行重力歸算(gravity reduction)? 請列舉兩種重力歸算的方式，略述兩者優劣。並解釋何謂直接效應(direct effect)，間接效應(indirect effect)，以及 co-geoid。(30%)
2. 為何在正高系統(orthometric height)中水準測量(leveling)的逐差觀測資料需要進行正高改正(orthometric correct)? 請簡述一個正高改正的方法，並討論這個方法與正高定義可能的系統誤差。(30%)
3. 如下圖，我們在 A 點設置潮位站(tide gauge)，以 A 點觀測 18.6 年得到的平均海水面作為起算面，以水準網建立全島正高高程參考系統。現在又選擇 B 點的潮位站同樣以 18.6 年觀測所得的平均海水面當成第二個起算面加入參考系統的水準網中。請問這會帶來甚麼樣的好處？或者是甚麼樣的問題？(40%)



(c)