

(本卷為本科目第一部分，為閉書，先考，繳卷後開

書考第二部分，本科考試時間總長兩小時)

# 國立交通大學九十八學年度第一學 期

## 博士班資格考筆試考試試題

土木工程學系測量組 科目：GIS and Cartography 選考學生數：1 考試時間：2hr  
(Close Books)

---

共 1 頁，第 1 頁

1、(1) 請說明與討論地圖投影的幾何特性；(2) 介紹台灣目前所採用的坐標系統及其被採用的原因。(25%)

2、(1) 地圖概括化 (map generalization) 是地圖資料處理與展現的重要的課題。請介紹地圖概括化的本質及主要的概括化方法；(2) 請討論在資訊化時代的數值地圖學 (digital cartography)，地圖概括化有何新的議題或挑戰。(25%)

(本卷為本科目第二部分，為開書，第一部分繳卷後開書  
考本卷，本科考試時間總長兩小時)

## 國立交通大學九十八學年度第一學期 博士班資格考筆試考試試題

土木工程學系測量組 科目：GIS and Cartography 選考學生數：1 考試時間：2hr(Open Books)

---

共 1 頁，第 1 頁

1. "The density of a set  $P$  of points is related to the number of points inside a circle of some size. By placing the circle at different locations, the density at these locations can be determined."

This definition captures the intuition well because we are dealing with points. If a set  $R$  of regions is given, we could replace every region by its center of gravity or another representative point, and determine the density of these points. This is not such a good idea. Explain why not. Suggest a different way of determining density for the regions of  $R$ , without replacing the regions by points. Take the size of each region into account too. Be precise and not too short.

2. Spatial interpolation between points with measurements has been applied in many GIS applications, for example in the part about spatial autocorrelation and in the part about terrains and triangulations.

Several geographic variables have a directional dependency. For example, the spread of air pollution is influenced by the direction of the wind, so if the wind is West, there is more correlation in the East-West direction than in the North-South direction.

Discuss how this directional dependency (also called anisotropy) affects spatial autocorrelation (and the variogram) and how it affects spatial interpolation by triangulation (is the Delaunay triangulation still suitable?).