

應用邊緣偵測法於地電阻試驗結果之地層分界判釋

蕭仲富 馮正一*

摘要 本研究應用拉氏邊緣偵測法 (Laplacian Edge Detection, LED) 與基岩邊緣偵測法 (Bedrock Edge Detection, BED) 於地電阻剖面法 (Electrical Resistivity Tomography, ERT) 所測得之資料, 進行地層分界判釋並探討此兩種方法之成效。本研究亦以地電阻正算模型之數值模擬結果, 分析地形效應對地層分界判釋之影響。分析結果發現基岩邊緣偵測法與拉氏邊緣偵測法各有其適用性。本研究以台中縣東勢鎮東勢林場之邊坡進行 ERT 現地試驗, 並配合鑽孔資料以輔助地層分層判釋之準確性。

關鍵詞: 地電阻剖面法、邊緣偵測、地形效應。

Application of Edge Detection Methods on Interpretation of Slope Strata from Electrical Resistivity Tomography Outcomes

Chung-fu Shiao Zheng-yi Feng*

ABSTRACT This study applied the methods of Laplacian Edge Detection (LED) and Bedrock Edge Detection (BED) to Electrical Resistivity Tomography (ERT) data for locating the interfaces of strata. The effectiveness of the two methods was discussed. This study also used numerical forward models of ERT to discuss the influence of the topography effect on locating the interfaces of the strata. The results indicate the BED and LED methods have different suitability for different applications aspects. We performed a field ERT survey at Dong-Shi Forest Farm and the test results were used with the borehole data to increase the interpretation accuracy of the interface locations.

Key Words: Electrical resistivity tomography, bedrock edge detection, topography effect.

一、前言

本研究探討拉氏邊緣偵測法與基岩邊緣偵測法應用於地電阻剖面影像法 (Electrical Resistivity Tomography, ERT) 試驗結果之地層分界偵測工具。本研究亦針對於台中縣東勢鎮東勢林場之邊坡進行多期現地 ERT 試驗後, 應用此二法分析地層內之岩層分界。地電阻法自 20 世紀中期發展起即廣泛應用於

地下狀態之偵測, 尤其對於地下水、地層材料具有極高的辨別能力, 具有施測方式簡單、快速與經濟性較高等優點。然地電阻剖面法施測時, 除電極排列方式、反算程序之方法對判讀結果有所影響外, 於非水平地表時, 極易受到地形效應影響以致偏差 (梅興泰等, 2006), 經常地表傾斜即會產生地形效應。應用地形效應修正法, 可系統性地研究坡度對結果判讀之影響。為增進 ERT 資料之可判釋度, 使其應用於斜坡、谷地