網形穩健度提升方法之探討

Approaches for Improving the Robustness of the Network

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摘　要

近年來，國內已有學者將 Vaníček et al.(1991,2001)的穩健度理論由 2D 推展至 3D，並提出合宜的量化指標，以適用於包括 GPS 及各種測量網形。經由他們的研究發現，網形穩健度較弱的點位，乃由於該等點位通常具有較少的網點測線連測數、觀測量之多餘觀測數總和較小；觀測量的精度、網形的基線與點位結構，都可能成為弱穩健度之所在。基於此，為了改進網形之穩健度，本研究朝調整觀測量權值、增(刪)點位之連線數目、增(刪)已知點位或研究點位以及改變點位連線結構等來探討對網形穩健度之影響。本研究以台灣中西部一、二等控制點平面網為研究例，初步發現，本研究之方法確能改進網形穩健度。

關鍵詞：穩健度、多餘觀測數

Abstract

In recent years, some scholars have expanded the robustness theory (Vaníček et al. 1991, 2001) to include 3 dimensions. Their studies have shown that robustness is relatively weak in some positions of the network. Lack of connecting lines on those positions, less total redundancy numbers of observations, the precision of observations, and the structure of positions or baselines of the network might affect the robustness level of the network. For improving the robustness level, several approaches have been taken in this study, such as changing in observation values, changing in observation weights, deletion or addition of observations, deletion or addition of points of the network. This study takes the second-order GPS network in the mid-west region of Taiwan as an example. The preliminary results show that these approaches can really improve the robustness level of the network.

Keyword：Robustness, Redundancy number

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