Notice of University Oral Examination

Geodesy and Geomatics Engineering

Doctor of Philosophy

Mustafa Berber

Thursday, March 23, 2006
Head Hall – ADI Room @ 2:00 pm

Co-Supervisors:	Dr. Peter Dare, Geodesy and Geomatics Eng.
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Chair:	Dr. Gwendolyn Davies, School of Graduate Studies

Robustness Analysis Of Geodetic Networks

ABSTRACT

After geodetic networks are established, relevant measurements are made and point coordinates for the control points are estimated by the method of least squares. However, the method of least squares does not give any information about the robustness of networks. To measure robustness of a network the degree of deformation of displacements of individual points of the network is measured by strain. The strain technique is independent of adjustment constraints and reflects only the network geometry and accuracy of the observations. Furthermore, threshold values are needed to evaluate networks. These threshold values are going to enable us to evaluate the robustness of the network. If the displacements of individual points of the network are worse than the threshold values, we must redesign the network by changing the configuration or improve the measurements until we obtain a network of acceptable robustness.

The measure of robustness should be independent of the choice of a datum so that the analysis of a network using a different datum will give the same answer. Robustness should be defined in terms of invariants rather than the primitives since a datum change will change the gradient matrix and therefore the primitive values.

Robustness of a network is affected by the design of the network and accuracy of the observations. Therefore the points that lack robustness in the network may be remedied either by increasing the quality of observations and/or by increasing the number of observations in the network. A remedial strategy is likely to be different for different networks since they have different geometry and different observations. There might not be a solution fitting all networks but in this thesis a general strategy is given.