Notice of University Oral Examination

Geodesy and Geomatics Engineering

Doctor of Philosophy

Rodrigo Leandro

Thursday, April 9, 2009
Head Hall – Room E-11 @ 2:00 pm

Supervisor: Dr. Marcelo Santos, GGE
Examining Board: Dr. Richard Langley, GGE
                             Dr. Donghyun Kim, GGE
                             Dr. P.T. Jayachandran, Physics
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Chair: Dr. Ed Biden, School of Graduate Studies

PRECISION POINT POSITIONING WITH GPS: A NEW APPROACH FOR POSITIONING, ATMOSPHERIC STUDIES, AND SIGNAL ANALYSIS

ABSTRACT

Precise Point Positioning (PPP) is one of the existing techniques to determine point coordinates using a GPS (Global Positioning System) receiver. In this technique observations collected by a single receiver are used in order to determine the three components of the coordinates, as well as other parameters, such as the receiver clock error and total neutral atmosphere delay.

The PPP technique is the main object of this thesis. The main idea is that PPP can be used not only for positioning, but for a variety of tasks, such as GPS data analysis. The fact that the observation model used in this technique has to take into consideration most of the several effects present on GPS signals, and that observations are un-differenced (there are no differences between receivers or between satellites), makes PPP a powerful data analysis tool which is sensible to a variety of parameters. When the observation model is designed for positioning, most of these parameters (e.g., satellite clocks) are used as known quantities, but in this research the observation model was modified and enhanced to develop a PPP package that can be used as a tool for determining other parameters rather than position, receiver clock error and neutral atmosphere delay. These estimated parameters include ionospheric delay, code biases, satellite clock errors, and code multipath plus noise.

Existing neutral atmosphere delay models have also been studied in this thesis, and an enhanced model has been developed and has had its performance assessed. The development of the model is based on measured meteorological parameters, and the rationale of the model is established in order to make its use as practical as possible for users of positioning techniques, such as PPP.

Faculty Members and Graduate Students are invited to attend this presentation