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ENHANCEMENT OF THE SINGLE POINT POSITIONING ACCURACY (USING THE OBSERVATIONS OF IGS SERVICE)

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ABSTRACT

This research tends to improve the GPS Absolute Point Positioning (APP) accuracy by using the daily observations for the nearest station of International GPS Service network 'called DRAG station' and solving its observations data differentially with the observations data of any unknown points in the studied area in EGYPT. But, there is a main problem; because the DRAG station located at a distance about 660km from the studied points which leads to the impossibility of eliminating the ionospheric error and orbital error with differential processing. Therefore, the resultant positioning accuracy was low, it is about 2.5m. To overcome the previous problem and errors, the data is processed as follows : firstly, observing a fixed point in the studied area at a distance between it and the unknown point less than 20km, and solving its observations relative to the DRAG station observations by using the triple difference technique ; secondly, estimating the change in ionospheric error from the previous step after using the precise ephemeris data to adjust the orbital errors ; finally, estimating the unknown point coordinates by solving their observations relative to the DRAG station observations by a triple difference technique with using the precise ephemeris data and the previous estimated value of change in ionospheric error. It is found that this adjusting process enhances the improvement of the positioning accuracy, about 30 cm , if the interval period between observing the fixed and unknown point is less than 100 min.

KEYWORDS: GPS, Absolute Point Positioning, Phase Measurements, IGS Service, Triple Difference.