

Triple Frequency Multi-GNSS Cycle Slip Detection Using Ionospheric Residuals.

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SUMMARY

Cycle Slips are a limiting factor when using carrier phase GNSS. These are caused by a number of factors, both physical and electronic in nature. This paper investigates the use of the ionospheric residuals to detect cycle slips. The ionospheric residual value is the residual, caused by the ionosphere, when using the frequency combination multiplier to convert from one frequency carrier phase value into another. In a vacuum, this value would be zero. However, due to the ionosphere, this value exists. This value changes relatively slowly over time, due to the moving satellites' GNSS data passing through changing ionosphere. By analysing the change in ionospheric residual from individual satellites between high rate epochs, the change is close to zero. However, when a cycle slip occurs, the residual value jumps.

Data from triple frequency GPS, Galileo and BeiDou satellites are used to illustrate the precision of such measurements, as well as the ability to detect cycle slips introduced into real data.

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