

# **Using Adaptive Filtering to Detect Multipath and Cycle Slips in GPS/Accelerometer Bridge Deflection Monitoring Data**

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## **ABSTRACT**

The use of accelerometers and GPS, either separately or as a combined approach is becoming a reliable and useful tool for real time bridge deflection monitoring.

RTK GPS for such monitoring, however, is prone to error sources such as multipath and cycle slips. Adaptive Filtering (AF) is being investigated at the University of Nottingham as a tool that can be used to combine the accelerometer and GPS data, as well as to detect and correct the GPS data for multipath and cycle slips.

The following paper details the AF theory used, as well as its incorporation into the GPS/accelerometer bridge deflection data. Trials have been conducted upon a suspension bridge. The results of these trials illustrate that it is indeed possible to detect such error sources using the proposed filtering.

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