International Journal of Navigation and Observation

Special Issue on
Advances in Signal Tracking for GNSS Receivers: Theory and Implementation

Call for Papers

Recently, significant research effort has taken place in the area of new architectures and design of global navigation satellite systems (GNSSs) receivers, with the aim of improving the receiver performance in terms of accuracy and reliability through innovative signal processing techniques, especially addressing multipath, interference, and deep fading effects. The main driving factors of this trend are the large amount of redundant information that will be available with the planned upgrades of GPS and the new deployment of GNSS constellations as well as the availability of rapid prototyping tools that shorten the path from system conception and validation to its implementation in VLSI circuit technologies.

In this context, it is foreseen that, in the near future, GNSS receivers will be substantially different from traditional approaches by taking advantage of novel signal processing techniques. Specifically, receiver-tracking loops will improve their performance under interference or signal-obstructed environments due to the application of sophisticated tools (including maximum likelihood algorithmic implementations, Bayesian filtering approaches, and heuristic solutions), resulting in the design of efficient, yet robust, algorithms. As an example, large research efforts have been carried out in the analysis and implementation of tracking loops directly operating in the parameter space of user coordinates (i.e., position and velocity) such as vector loops and direct position estimation. Closely related to the latter are ultra-tight GNSS/inertial integration methods in which motion-related information is used to improve the performance of the tracking loops.

This special issue aims at reflecting current research trends and new approaches in signal-tracking methods and their implementation in GNSS receivers. Potential topics include, but are not limited to:

- Tracking loops for multisystem/multiband receivers
- Robust signal tracking in the presence of interference and multipath
- Direct position estimation theory and implementation
- Adaptive vector tracking loops
- Bayesian extensions and architectures for position tracking loops
- Ultra-tightly coupled GNSS/INS methods
- Theoretical relations among position tracking loop designs
- Experimental verification and validation of advanced receiver techniques

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