Title: Multi-Antenna Systems for GNSS

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Abstract:

The quality of the ranging data provided by a global navigation satellite systems (GNSS) receiver largely depends on the synchronization error, that is, on the accuracy of the propagation time-delay estimation of the line-of-sight (LOS) satellite signal. In case the LOS signal is corrupted by several superimposed delayed replicas (multipath) and additional radio interference, the estimation of the propagation time-delay and thus positioning can be severely degraded using state-of-the-art receivers.

Multi-antenna systems can provide enhanced robustness to multipath and radio interference, but applications strongly demand that antenna arrays need to be physically small, thus reducing the footprint of the single elements and inter-element spacing is required. In general, this results in stronger mutual coupling between the antenna elements. On the other hand, exploiting not only time and spatial domain but also different domains like polarization or frequency bands has excellent potential in separating LOS signals from non-LOS signals and radio interference and thus enabling enhanced time-delay estimation and positioning.

In this talk, the potential of multi-antenna systems for GNSS is introduced, and the application of multidimensional signal processing (tensor-based signal processing) as a promising approach for multipath and radio interference mitigation for GNSS is discussed. To consider mutual coupling of antenna elements, linear and nonlinear array interpolation methods are presented.