Generalized Sidelobe Canceller

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Spatial Filtering

- **This class**: Generalized Sidelobe Canceller (GSC)
- **Sidelobe Canceller:** separate “something we want” from “something we don’t want”
- We can visualize what we don’t want as the sidelobes of the equivalent antenna pattern of the array, which we want to reduce without hurting the main lobe

Generalized Sidelobe Canceller

- Fingind the GCS filter corresponds to a minimization problem with linear constraints
- The filter weights corresponds to antenna elements (spatial dimension)

bla bla

- Objective
- Limitations
  - Robustness to errors?
- Interesting Variations?
  - A Robust Adaptive Generalized Sidelobe Canceller With Decision Feedback (2005)
    `https://ir.nctu.edu.tw/bitstream/11536/13077/1/000233501000048.pdf`
  - A robust generalized sidelobe canceller via steering vector estimation (2016)
    `http://asp.eurasipjournals.springeropen.com/articles/10.1186/s13634-016-0358-7`

MATLAB Code

https://www.mathworks.com/help/phased/ref/phased.gscbeamformer-class.html
The phased.GSCBeamformer System object™ implements a generalized sidelobe cancellation (GSC) beamformer. A GSC beamformer splits an array's incoming signals sends them through a conventional beamformer path and a sidelobe canceling path. The algorithm first presteers the array to the beamforming direction and then adaptively chooses filter weights to minimize power at the output of the sidelobe canceling path. The algorithm uses least mean squares (LMS) to compute the adaptive weights. The final beamformed signal is the difference between the outputs of the two paths.