On the Capacity of the AWGN Channel with Additive Radar Interference

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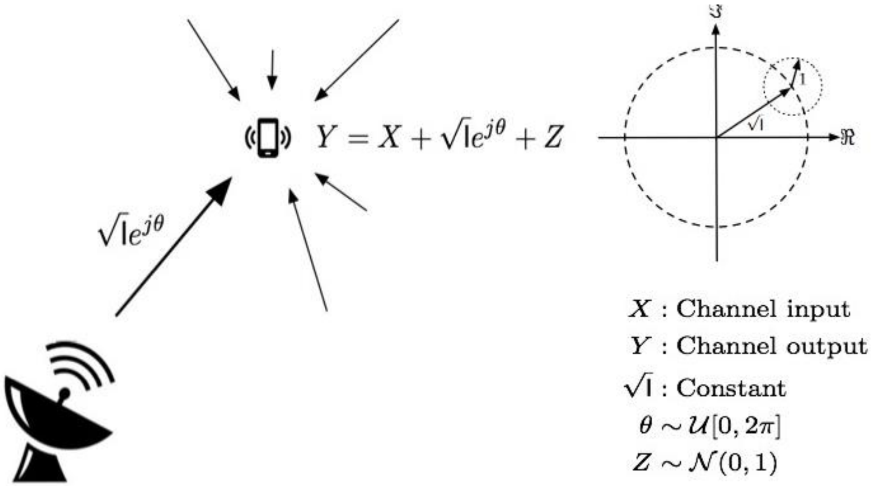
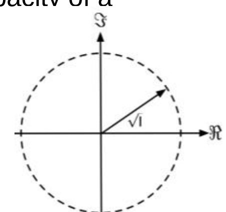


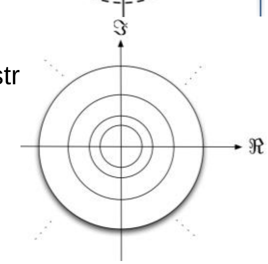
Problem Statement and Motivation

- Shortage of spectrum resources, specially with the ever increasing demand for commercial services, necessitates a more sensible bandwidth allocation policy.
- Portions of radar-only spectrum is now open for commercial wireless services hence the radar and communication systems have to share the spectrum with one another.
- We investigate the problem from the *communication system perspective* and seek to find the capacity of a communications channel that, in addition to additive white Gaussian noise, also suffers the interference from a co-existing radar transmission.
- We find the structural properties of capacity achieving input distribution.

Technical Approach

- We take an information theoretic approach to find the capacity of a communication system in presence of radar interference.
- We model the radar interference as an additive term whose amplitude is known and constant, but whose phase is uniformly i.i.d at each channel use.
- We find the structure of the capacity achieving input distr average power constraint.
- We find the capacity achieving input for the large interference to noise ratios.





Key Achievements and Future Goals

- S. Shahi, D. Tuninetti, N. Devroye, ``On the Capacity of the AWGN Channel with Additive Radar Interference ,'' *Allerton* 2016.
- Future goals:
  - Extensions to MIMO/OFDM channels.
  - Finding the location and probabilities of the mass points of the optimal input.

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