

Task-Specific MIMO Communication Systems

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Overview

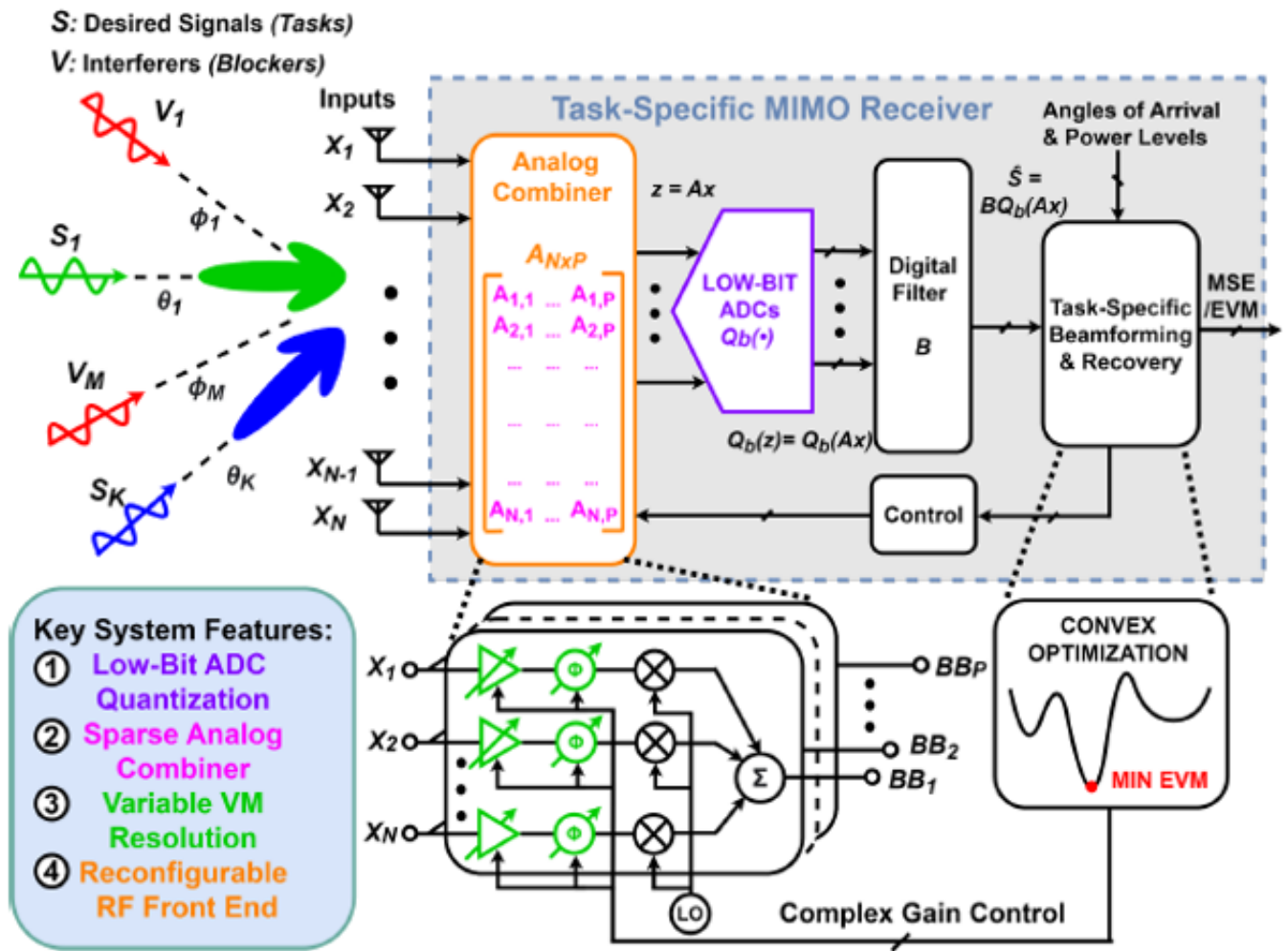
This task-specific MIMO system enables highly accurate signal recovery with minimal hardware complexity and power consumption. It combines task-specific beamforming, low-bit ADCs, and quantized analog combiners to efficiently leverage signal sparsity and suppress spatial interference. The result is a robust and energy-efficient solution for modern wireless communication systems, including 4G/5G infrastructure and high-performance receiver front-ends.

Applications

- 4G/5G MIMO communication systems
- Analog to digital converters.
- Receiver front ends

Differentiation

- Minimized hardware complexity
- Accurate task-specific signal recovery
- High power efficiency
- Low power consumption



Task-specific MIMO receiver system diagram

Development Stage

Supported by simulations, the system effectively suppresses spatial interference and recovers target signals in congested bands. A task-specific MIMO receiver (TSMRx) was implemented in 65 nm CMOS with beamforming, 2-bit ADCs, 4-point vector modulators, and a 25% sparse combiner, achieving task recovery while consuming just 75â€#147;115 mW over 0.5â€#147;3 GHzâ€#148;setting a power efficiency record for this technology node.

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References

[Zirtiloglu, T. et al., ICASSP, 2022.](#) [1]

[Zirtiloglu, T. et al., A-SSCC, 2023.](#) [2]

