Yu-tang Zhu, Yong-bo Zhao, Jun Liu, Peng-lang Shui, 2016. Low complexity robust adaptive beamforming for general-rank signal model with positive semidefinite constraint. *Frontiers of Information Technology and Electronic Engineering*, **17**(11):1245-1252. http://dx.doi.org/10.1631/FITEE.1601112

Low complexity robust adaptive beamforming for general-rank signal model with positive semidefinite constraint

Key words: Beamforming, General-rank, Low complexity, Positive semidefinite (PSD) constraint, Model mismatches

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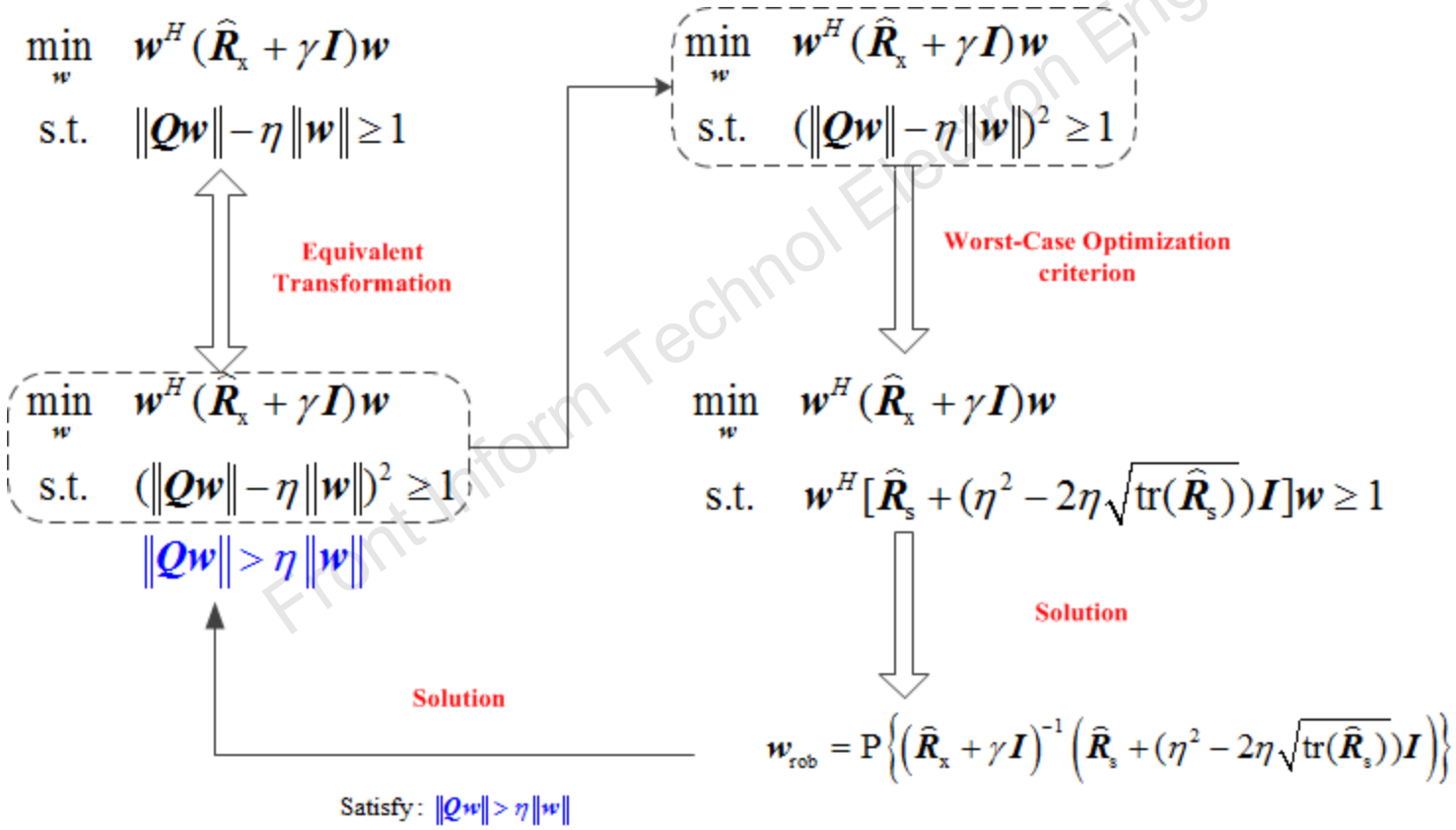
Introduction

- The Conventional robust adaptive beamforming algorithms for general-rank signal model with positive semidefinite constraint suffer from high computational costs due to the application of iterative semidefinite programming.
- To reduce the computational costs while maintaining a good performance, a closed-form beamformer is proposed based on the worst-case performance optimization criterion.
- Simulation results are presented to verify the validity and robustness of the proposed beamforming method.

Model Simplification using worst-case performance optimization criterion



Measurement results

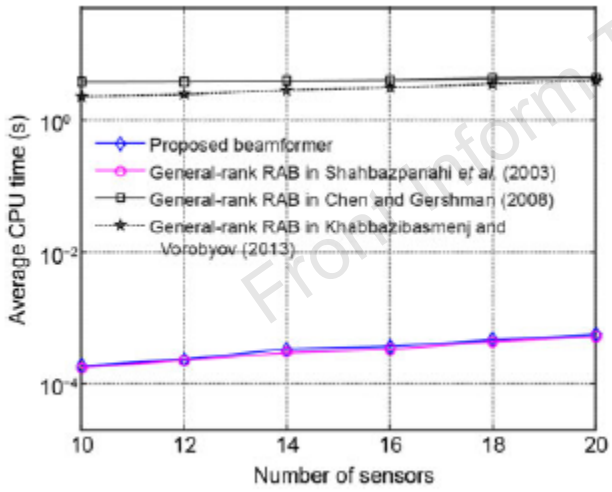


Fig. 2 Average CPU time versus the number of sensors

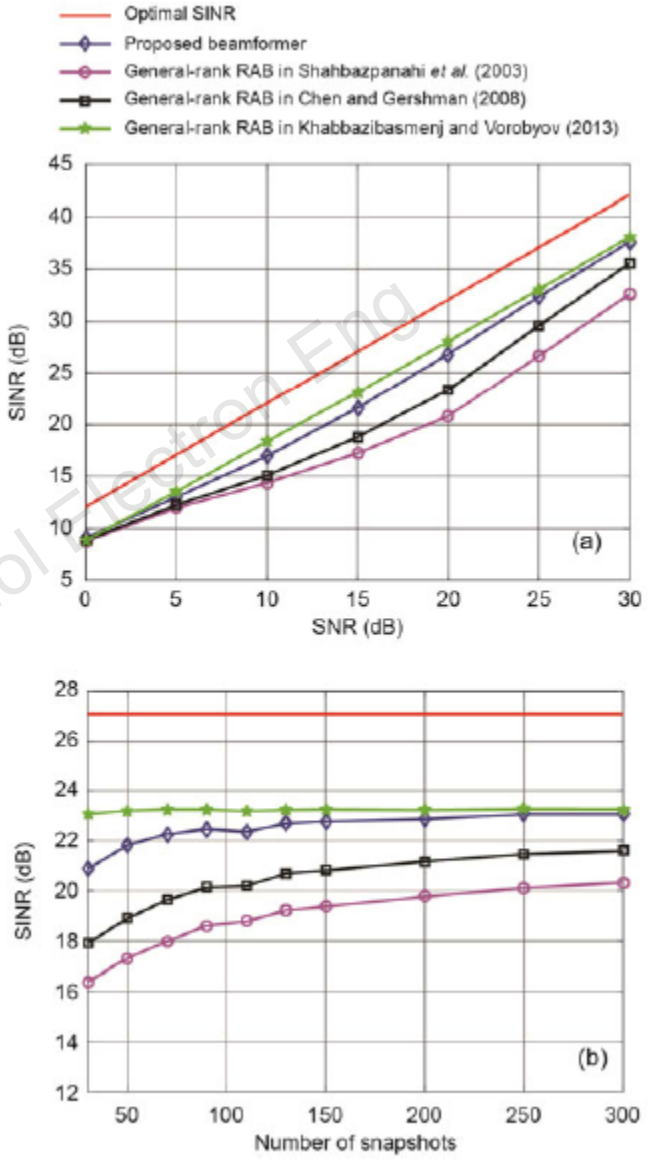


Fig. 1 Output SINR versus SNR (a) and the number of snapshots (b)

Conclusions

- The proposed beamformer achieves a competitive SINR compared to those proposed in the recent literature, but at a significantly lower computational cost.

- The proposed beamformer has a closed-form weight vector, which contributes to the online and real-time processing.