Universidade Federal do Ceará

Centro de Tecnologia

Departamento de Engenharia de Teleinformática

Engenharia de Teleinformática

Multilinear Algebra
Computational Homeworks

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Course   Multilinear Algebra - TIP8419

Fortaleza, 2021

Homework 0
Kronecker Product Run Time

Homework 1
Hadamard, Kronecker and Khatri-Rao Products

Homework 2
Khatri-Rao Product Run Time

Homework 3
Least-Squares Khatri-Rao Factorization (LSKRF)

Implementation LSKRF
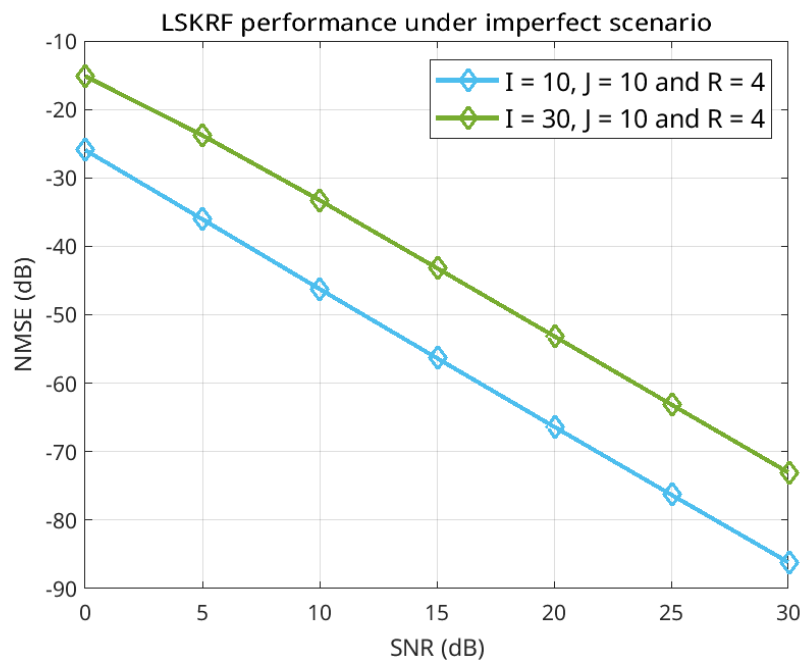
Monte Carlo Experiment

Figure 1: Monter Carlo Experiment with 1000 runs for LSKRF algorithm.

Homework 4
Least Squares Kronecker Product Factorization (LSKronF)

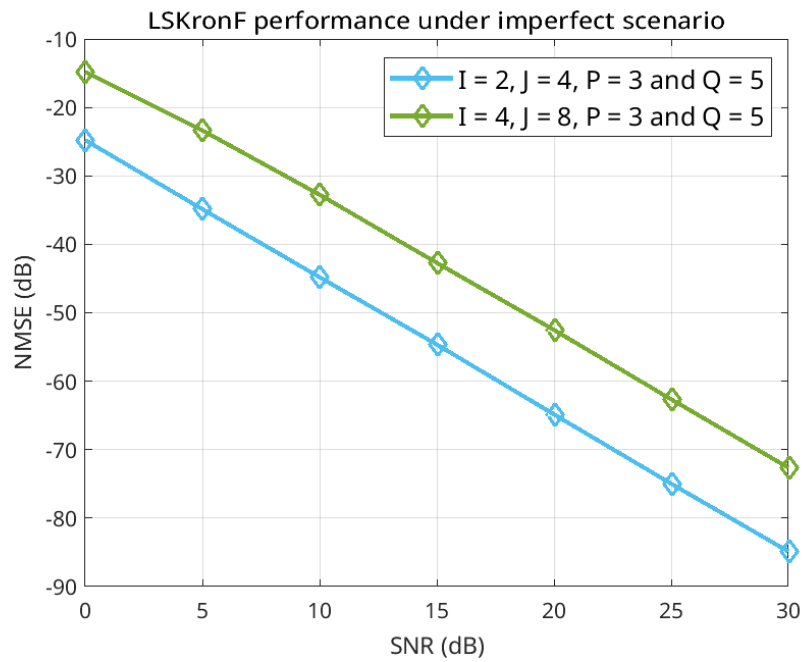**Implementation LSKronF**

Monte Carlo Experiment

Figure 2: Monter Carlo Experiment with 1000 runs for LSKronf algorithm.

Homework 5
Kronecker Product Singular Value Decomposition (KPSVD)

Implementation KPSVD

Validation of KPSVD

Homework 6
Unfolding, folding, and n-mode product

Implementation unfolding, folding and n-mode product

Validation of unfolding, folding and n-mode product

Homework 7
High Order Singular Value Decomposition (HOSVD)

Implementation HOSVD

Validation of HOSVD

Homework 8
High Order Order Orthogonal Iteration (HOOI)

Implementation HOOI

Validation of HOOI

Homework 9
Multidimensional Least-Squares Khatri-Rao Factorization (MLS-KRF)

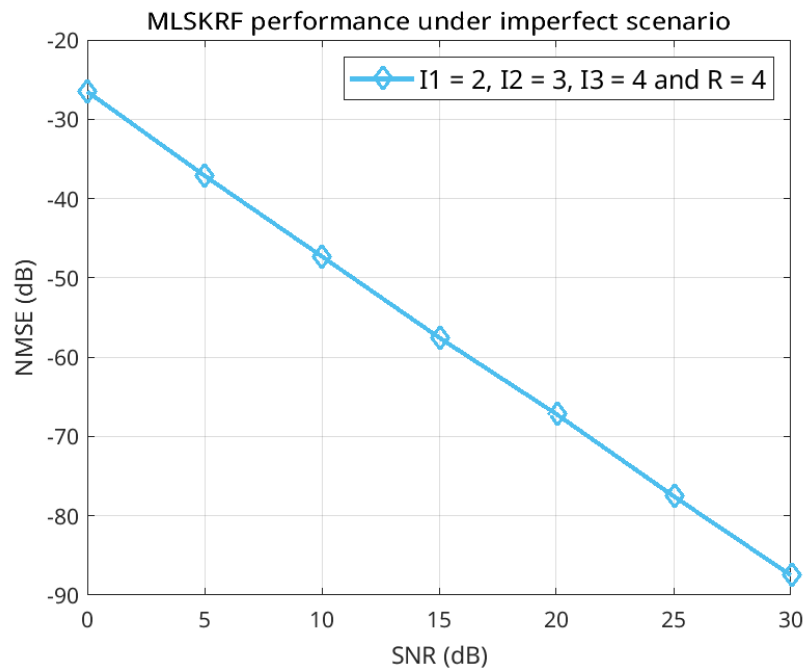**Implementation MLS-KRF**

Monte Carlo Experiment

Figure 3: Monter Carlo Experiment with 1000 runs for MLS-KRF algorithm.

Homework 10
Multidimensional Least-Squares Kronecker Factorization (MLS-KronF)

Implementation MLS-KronF
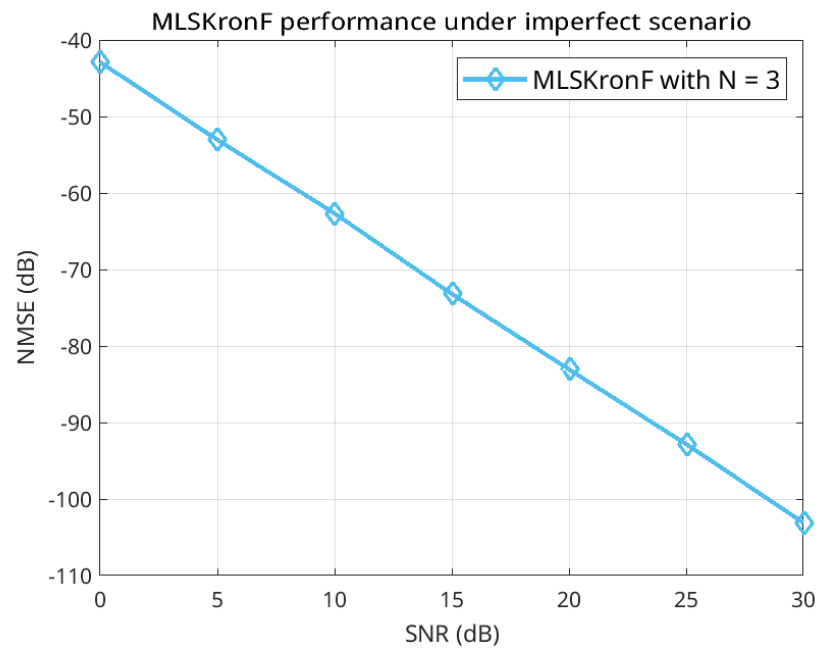
Monte Carlo Experiment

Figure 4: Monter Carlo Experiment with 1000 runs for MLS-KronF algorithm.

Homework 11
Alternating Least Squares (ALS) Algorithm

Implementation of ALS
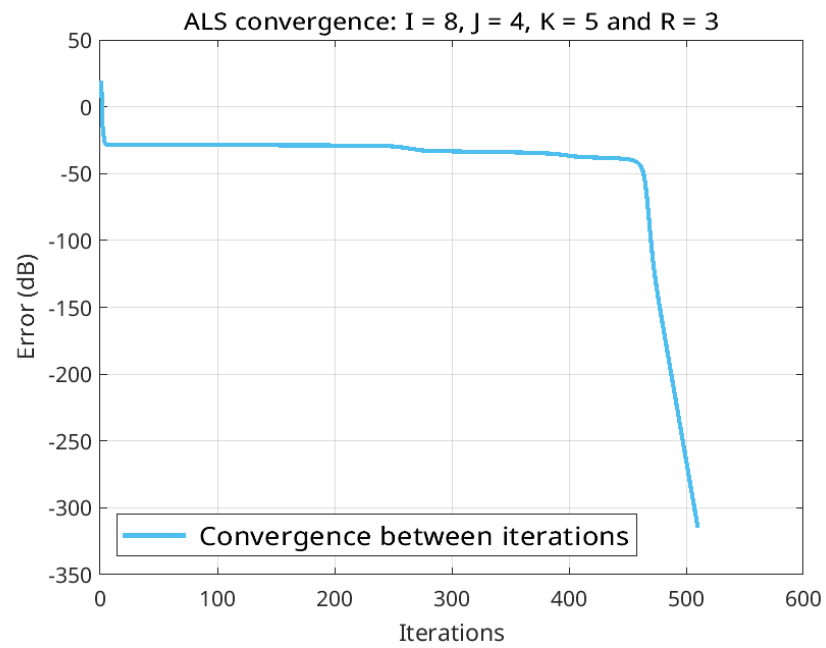
Monte Carlo Experiment

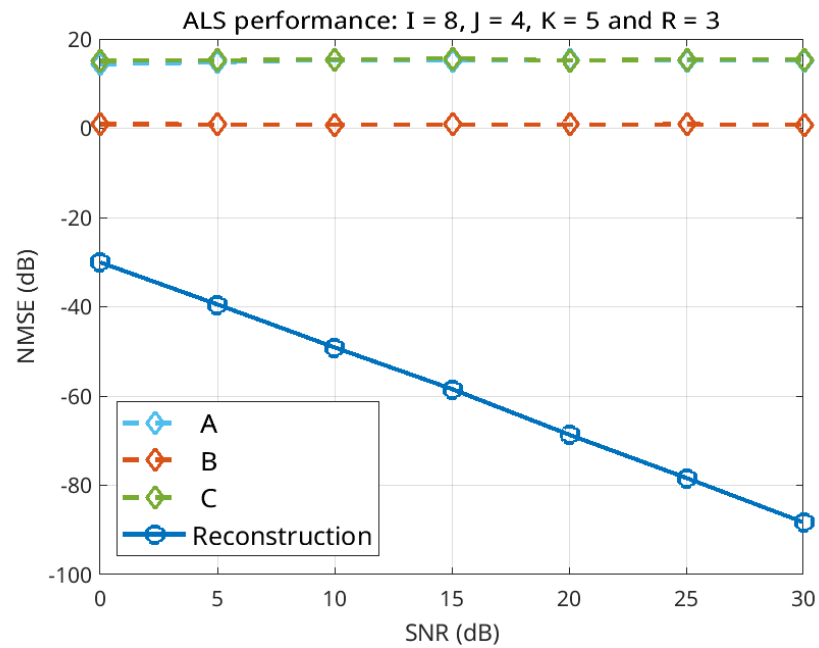Figure 5: Convergence behavior of ALS algorithm.

Figure 6: Monter Carlo Experimento with 1000 runs for ALS algorithm.

Homework 12
Tensor Kronecker Product Single Value Decomposition (TKPSVD)

Implementation of TKPSVD
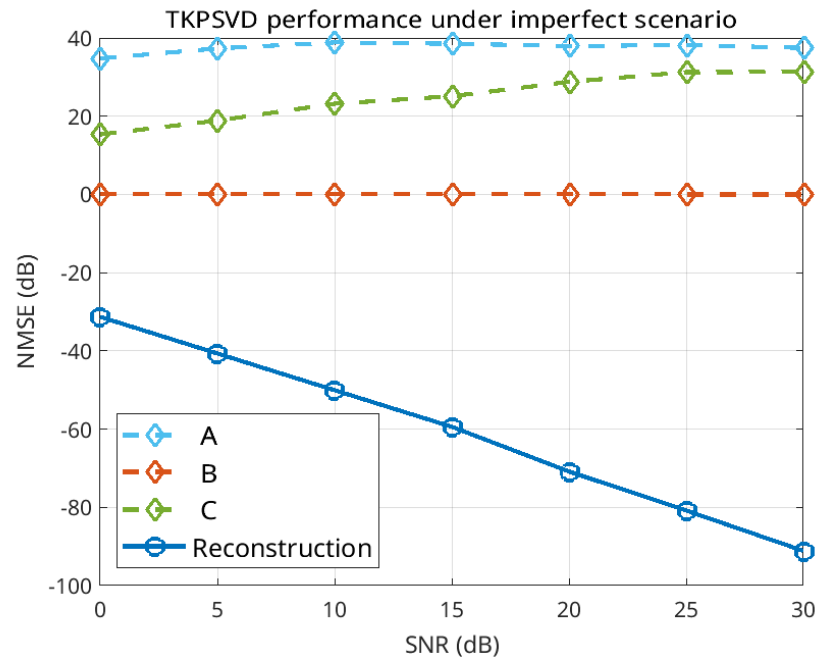
Monte Carlo Experiment

Figure 7: Monter Carlo Experiment with 1000 runs for TKPSVD algorithm.

Homework 13
Tensor Train Single Value Decomposition (TTSVD)

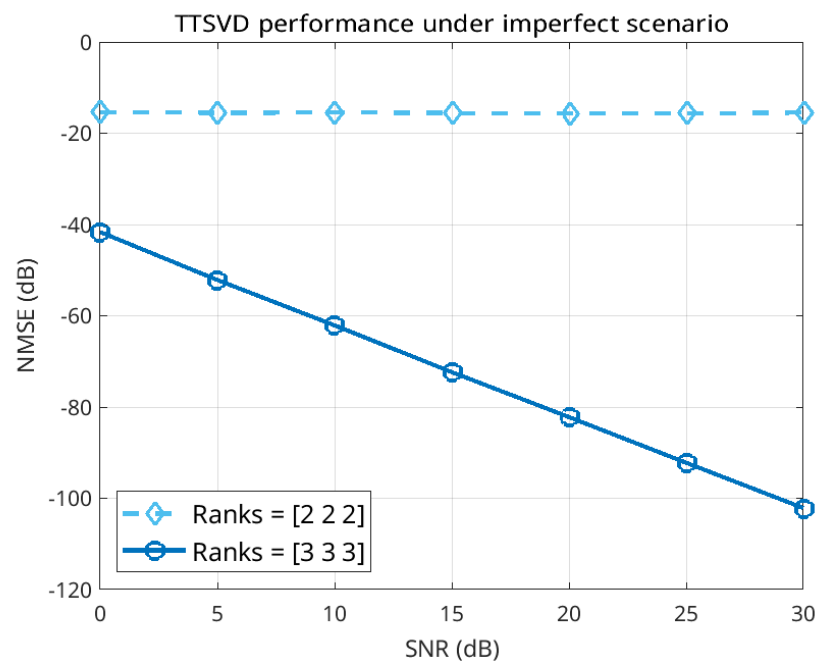**Implementation of TTSVD**

Monte Carlo Experiment

Figure 8: Monter Carlo Experiment with 1000 runs for TTSVD algorithm.