Linear Algebra Issues in Wireless Communications

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Aim & Short Outline

Brief introduction in the state-of-the-art problems of matrix calculations in wireless communication should allow participants to understand importance of matrix methods for systems, which become part of our life.

The course is presented by 3 parts:

- **Introduction in wireless communication and its relation to linear algebra problems**
  - System model of wireless communication
  - Capacity of the system and linear space extension
  - Definition of system matrix and its properties discussion
  - Outlook of matrix methods that are playing important role in telecom.
- **Matrix methods and requirements to them from the industry**
  - Not well-posed problems in the sense of Hadamard (ill-posed problems)
  - QR, LU, iterative methods and requirements to them from wireless systems
  - Important role of SVD in ultra-high rate communications
  - Belief propagation approach in detection problems
  - Topic for next time discussion (task for home preparation)
- **Implementation issues**
  - The simplest one doesn't mean the fastest one
  - Robustness & accuracy
  - Task analysis and discussion