Compressed Sensing

ZS 2021/22, FJFI ČVUT

List of topics

Definitions and theorems from the lecture (including proofs):

Z1. Sparse vectors, compressible vectors, best s-term approximation

Z2. (P_0), (P_1), NP-complexity of (P_0) (definition, theorem)

Z3. Fast and discrete Fourier transform

Z4. Null Space Property, definition, NSP $\Leftrightarrow$ (P_1)

Z5. RIP, RIP $\implies$ NSP, sketch of the proof

Z6. 2-stability of $\mathcal{N}(0,1)$, concentration of measure

Z7. RIP for one fixed point, nets on the sphere

Z8. Gauss matrices have RIP - theorem

Z9. Lemma of Johnson and Lindenstrauss

Topics - extension

R1. Prony method - proof

R2. Stable NSP, proof

R3. RIP $\implies$ NSP, full proof

R4. Gauss matrices have RIP - full proof

R5. Optimality of the number of measurements in the reconstruction of sparse vectors

R6. Details of `http://www.pyrunner.com/weblog/2016/05/26/compressed-sensing-python/`