INSTITUT FÜR SIGNALVERARBEITUNG
UND SYSTEMTHEORIE
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Matrix Computations in Signal Processing and Machine Learning

Dr.-Ing. Stefan Uhlich
Sony R&D, European Technology Center, Stuttgart

- **Contents:**
  - Basics and notation
    Vector/matrix norms, condition numbers, matrix derivatives, . . .
  - Useful matrix decompositions
    Eigen/singular value decomposition, nonneg. matrix factorization
  - Special matrices and their applications
    Toeplitz, Hankel, Vandermonde, Circulant

- **Applications that will be discussed in the lecture:**
  - Compressed Sensing
    "How can I efficiently sample and recover a sparse signal?"
  - Recommender systems
    "How does the book recommendation on Amazon work?"
  - PageRank algorithm
    "How does Google's search engine work?"
  - and many more where vector/matrix calculations play a fundamental role …

Time:	Monday, 8:00 - 09:30 h, Start: October 17th, 2016
Examination:	Oral or written examination, February/March 2017
Room:	Pfaffenwaldring 47, Room 2.282 (ISS Seminar Room)
Registration:	Please register via ILIAS for course participation and at the examination office for the examination!