

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

**DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

Module Title: Matrix Analysis for Signal Processing with MATLAB Examples

Lecturers:

Prof. Augusto Aubry

University of Naples “Federico II”

Department of Electrical Engineering and Information Technology (DIETI)

Email: augusto.aubry@unina.it

CV: Augusto Aubry received the Dr. Eng. degree in telecommunication engineering (with honors) and the Ph.D. degree in electronic and telecommunication engineering both from the University of Naples Federico II, Naples, Italy, in 2007 and 2011, respectively. He is currently under research agreement with the Department of Electrical and Information Technology Engineering, University of Naples Federico II. His research interests include statistical signal processing and optimization theory, with emphasis on MIMO communications and radar signal processing.



Dr. Vincenzo Carotenuto

University of Naples “Federico II”

Department of Electrical Engineering and Information Technology (DIETI)

Email: vincenzo.carotenuto@unina.it

CV: Vincenzo Carotenuto received the M.Sc. degree in telecommunication engineering and the Ph.D. degree in electronic and telecommunication engineering from the University of Naples Federico II, Naples, Italy, in 2010 and 2015, respectively. He is currently under research agreement with the Department of Electrical and Information Technology Engineering, University of Naples Federico II. His research interest lies in the field of statistical signal processing, with an emphasis on radar signal processing.



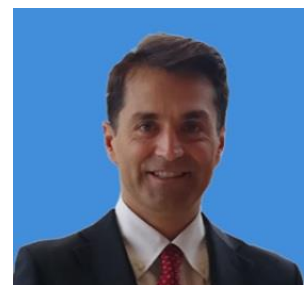
Prof. Antonio De Maio

University of Naples “Federico II”

Department of Electrical Engineering and Information Technology (DIETI)

Email: ademaio@unina.it

CV: Antonio De Maio received the Dr. Eng. (Hons.) and Ph.D. degrees in information engineering from the University of Naples Federico II, Naples, Italy, in 1998 and 2002, respectively. He is currently a Professor with the University of Naples Federico II. His research interest lies in the field of statistical signal processing, with emphasis on radar detection, optimization theory applied to radar signal processing, and multiple access communications.



Credits: 2

Overview

The course provides an overview on some topics in matrix theory together with their intrinsic interaction with and application to signal processing. The most important and "useful" tools, methods, and matrix structures are emphasized and complemented with MATLAB examples. The lectures cover basic matrix structures and operations, the concept of matrix norm, orthonormal matrices, singular value decomposition, positive (negative) semidefinite matrices and their eigenvalue characterization, Schur complement, matrix gradient, least square problems, Kronecker product.

Schedule

Lecture	Date	Time	Topics	Lecturer
1	22/03/2022	11:00-13:00	Basic matrix structures and operators. MATLAB examples.	A. De Maio V. Carotenuto
2	23/03/2022	14:00-16:00	Matrix norms. Orthonormal matrices, Matrix inverse. Singular Value Decomposition. MATLAB examples	A. De Maio V. Carotenuto
3	05/04/2022	11:00-13:00	Quadratic forms and positive (negative) semidefinite matrices. Schur complement. Eigenvalues and Eigenvectors. MATLAB examples.	A. Aubry V. Carotenuto
4	07/04/2022	16:30-18:30	Matrix calculus. Matrix Gradient. Least Square problems. Kronecker product. MATLAB examples.	A. Aubry V. Carotenuto
	TBD	TBD	Assessment test	

Online lectures are provided via Microsoft Teams

Team Code: **ekqjz8h**

For information: Dr. Vincenzo Carotenuto (DIETI, UniNA) – vincenzo.carotenuto@unina.it